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=> FILE REG
FILE 'REGISTRY' ENTERED AT 18:11:15 ON 10 FEB 2009
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=> DISPLAY HISTORY FULL L1-

     FILE 'HCAPLUS' ENTERED AT 16:16:27 ON 10 FEB 2009
L1          170 SEA IHARA E?/AU
L2         1262 SEA YANAGISAWA T?/AU
L3            1 SEA L1 AND L2

     FILE 'REGISTRY' ENTERED AT 16:17:07 ON 10 FEB 2009
L4            1 SEA 10043-11-5
                E BORON NITRIDE/CN
L5            1 SEA "BORON NITRIDE"/CN
L6          384 SEA (B (L) N)/ELS (L) 2/ELC.SUB

     FILE 'HCA' ENTERED AT 16:24:24 ON 10 FEB 2009
L7         3849 SEA (L4 OR L5 OR L6) (L) (CUBE# OR CUBIC?)
L8         7735 SEA CBN OR (C OR CUBE# OR CUBIC)(2A)(BN OR (BORON# OR
                B)(A)NITRIDE#)
L9         1141 SEA (L4 OR L5 OR L6) (L) HEXAG?
L10        4044 SEA HBN OR (H OR HEXAG?)(2A)(BN OR (BORON# OR B)(A)NITRID
                E#)
L11        1200 SEA (L4 OR L5 OR L6) AND (CUBE# OR CUBIC?) AND HEXAG?
L12       11160 SEA (MAGNESIUM# OR MG)(2A)(DOPANT? OR DOPE# OR DOPING#
                OR INTERSPERS? OR INTERCALAT? OR ADMIX? OR INMIX? OR
                INTERMIX? OR COMMIX? OR IMMIX?)

     FILE 'REGISTRY' ENTERED AT 16:28:17 ON 10 FEB 2009
                E MG/ELS
L13       164846 SEA MG/ELS

     FILE 'HCA' ENTERED AT 16:29:05 ON 10 FEB 2009
L14        12834 SEA L13 (L) (DOPE# OR DOPING# OR DOPANT?)

     FILE 'REGISTRY' ENTERED AT 16:31:22 ON 10 FEB 2009
                E LI/ELS
L15       124453 SEA LI/ELS

     FILE 'HCA' ENTERED AT 16:34:56 ON 10 FEB 2009
L16       383325 SEA L15
L17              QUE CAT# OR CATALY?
L18         1395 SEA (L7 OR L8) AND (L9 OR L10)
L19         1567 SEA L18 OR L11
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L20      275829 SEA (PHASE# OR PHASIC? OR PHASING#)(3A)(TRANSITION? OR
                TRANSFORM? OR CHANG? OR VARY? OR VARIES OR VARIED OR
                VARIAB? OR ALTER OR ALTERS OR ALTERRED OR ALTERED OR
                ALTERRING# OR ALTERING# OR ALTERAT?)
L21          219 SEA L19 AND L20
L22           47 SEA L21 AND L17
L23            4 SEA L22 AND (L12 OR L14)
L24           14 SEA L22 AND L16
L25      857410 SEA L13
L26           23 SEA L22 AND L25
L27              QUE DOPE# OR DOPING# OR DOPANT?
L28            4 SEA L26 AND L27
L29            3 SEA L24 AND L27
L30            9 SEA L19 AND ((L25 AND L27) OR L12)
L31          152 SEA L19 AND (L25 OR L12)
L32           52 SEA L31 AND L16
L33            4 SEA L32 AND L27
L34           13 SEA L32 AND L20
L35              QUE PHASE# OR PHASIC? OR PHASING#
L36          745 SEA L19 AND L35
L37            7 SEA L19 AND (L12 OR L14)
L38           70 SEA L36 AND (L12 OR L25)
L39            8 SEA L38 AND L27
L40           20 SEA L38 AND L16
L41           38 SEA L38 AND L17
L42           37 SEA L38 AND L20
L43           10 SEA L40 AND L41
L44           13 SEA L40 AND L42
L45           23 SEA L41 AND L42
L46        27041 SEA L4 OR L5 OR L6

     FILE 'REGISTRY' ENTERED AT 16:59:56 ON 10 FEB 2009
                E MAGNESIUM NITRIDE/CN
L47            2 SEA "MAGNESIUM NITRIDE"/CN
L48           34 SEA (MG (L) N)/ELS (L) 2/ELC.SUB
                E LITHIUM NITRIDE/CN
L49            1 SEA "LITHIUM NITRIDE"/CN
L50           40 SEA (LI (L) N)/ELS (L) 2/ELC.SUB

     FILE 'HCA' ENTERED AT 17:01:52 ON 10 FEB 2009
L51          987 SEA L47 OR L48 OR MG3N2
L52         1723 SEA L49 OR L50 OR LI3N
L53           61 SEA L19 AND L51
L54           81 SEA L19 AND L52
L55           21 SEA L53 AND L54
L56           21 SEA L55 AND (L17 OR L27 OR L35)
L57           41 SEA L53 AND L17
L58            3 SEA L53 AND L27
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L59 37 SEA L53 AND L35
L60 24 SEA L57 AND L59
L61 21 SEA (L57 OR L59) AND L54
L62 9 SEA L23 OR L28 OR L29 OR L30 OR L33 OR L37 OR L39 OR L58
L63 17 SEA (L24 OR L34 OR L43 OR L44) NOT L62
L64 34 SEA (L26 OR L45 OR L55 OR L56 OR L60 OR L61) NOT (L62 OR L63)
L65 9 SEA 1808-2003/PY,PRY,AY AND L62
L66 15 SEA 1808-2003/PY,PRY,AY AND L63
L67 30 SEA 1808-2003/PY,PRY,AY AND L64

=> FILE HCA
FILE 'HCA' ENTERED AT 18:11:30 ON 10 FEB 2009
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=> D L65 1-9 CBIB ABS HITSTR HITIND RE

L65 ANSWER 1 OF 9 HCA COPYRIGHT 2009 ACS on STN
142:265402 Production of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels. Ihara, Eiji; Yanagisawa, Taishu (Showa Denko K.K., Japan). PCT Int. Appl. WO 2005019371 A2 20050303, 40 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2004-JP12222 20040819. PRIORITY: JP 2003-296488 20030820; US 2003-498285P 20030828.

AB **Cubic boron nitride** is produced by holding **hexagonal BN** in presence of a **catalyst** substance under conditions in which **cBN** remains thermodynamically stable, to cause **hBN** to undergo a **phase transition** to form **cBN**. The **catalyst** contains a lithium source (such as Li3N), a magnesium source (such as magnesium nitride), and a carbon source (such as graphite). The performance of **cBN** is improved even though **phase transition** ratio from

hBN to **cBN** is increased.

IT **10043-11-5**, **Boron nitride**, processes
(**cubic**-, abrasives ceramics; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

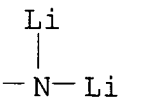
IT **7439-93-2**, Lithium, uses **7439-95-4**, **Magnesium**, uses
(**dopant**; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

IT **26134-62-3**, Lithium nitride
(lithium source; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **12057-71-5**, Magnesium nitride
(magnesium source; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM C09K003-14

ICS C01B021-064; C04B035-5831; B24D005-06
CC 57-7 (Ceramics)
ST lithium **magnesium** carbon **dopant** boron nitride ceramic grinding wheel
IT Ceramics
(boron nitride; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT Carbon black, processes
Hydrocarbons, processes
(carbon source; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT **Catalysts**
(lithium magnesium carbon-based; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT Grinding wheels
(prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT 7782-42-5, Graphite, processes
(carbon source; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT **10043-11-5**, **Boron nitride**, processes
(**cubic**-, abrasives. ceramics; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT **7439-93-2**, Lithium, uses **7439-95-4**, **Magnesium**, uses 7440-44-0, Carbon, uses
(**dopant**; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT **26134-62-3**, Lithium nitride
(lithium source; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
IT **12057-71-5**, Magnesium nitride
(magnesium source; prodn. of lithium-, magnesium- and/or carbon-**doped cubic BN** ceramics for grinding wheels)
RE
(1) Anon; EP 0407946 A1 HCA
(2) Anon; WO 2004069399 A1 HCA
(3) Anon; US 5332629 A HCA

L65 ANSWER 2 OF 9 HCA COPYRIGHT 2009 ACS on STN
133:353863 Investigation of the processes of crystallization and

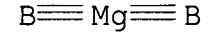
sintering of **cubic** boron nitride and its physical properties. Shipilo, V. B.; Gameza, L. M.; Anichenko, N. G.; Gielisse, P. J. (Institute of Solid State and Semiconductor Physics, National Academy of Sciences of Belarus, Minsk, 220726, Belarus). Journal of Wide Bandgap Materials, 7(3), 213-260 (English) **2000**. CODEN: JWBMFT. ISSN: 1524-511X. Publisher: Technomic Publishing Co., Inc..

AB The equipment and technol. required for the successful synthesis of **cubic** boron nitride, i.e., as a com. valuable commodity with proven market acceptance, is detailed. A parametric study involving the kinetics of nucleation and crystal growth at different pressures and temps. formed the background for the presentation of the salient features of the crystn. processes involving various **catalyst** -solvent-**dopant** systems. The conditions necessary for producing sintered cBN based polycryst. compacts and composites have been presented. The results reported herein have important implications for future applications of cBN as an engineering material.

IT **12007-25-9**, Magnesium diboride **26134-62-3**, Lithium nitride li3n
(**catalyst**-solvent; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)

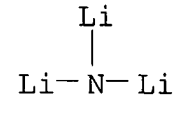
RN 12007-25-9 HCA

CN Magnesium boride (MgB2) (CA INDEX NAME)



RN 26134-62-3 HCA

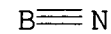
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5**, Boron nitride, processes
(**cubic**, ceramics; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)



CC 57-2 (Ceramics)

Section cross-reference(s): 76
ST crystn sintering **cubic** boron nitride ceramic property; **catalyst** solvent **dopant** system boron nitride crystn sintering; semiconductor ceramic **cubic** boron nitride crystn sintering
IT Ceramics
(boron nitride; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT Semiconductor materials
Semiconductor materials
(ceramic, boron nitride; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT Crystal growth
Crystal nucleation
Crystallization
Sintering
(crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT Structural **phase transition**
(**hexagonal**-to-**cubic**; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT Ceramics
Ceramics
(semiconductors, boron nitride; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT 1333-74-0D, Hydrogen, compds., uses 7727-37-9D, Nitrogen, compds., uses
(additive; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT **12007-25-9**, Magnesium diboride **26134-62-3**, Lithium nitride li3n
(**catalyst**-solvent; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT **10043-11-5**, Boron nitride, processes
(**cubic**, ceramics; crystn. and sintering of **cubic** boron nitride in **catalyst**-solvent-**dopant** systems and phys. properties)
IT 7440-21-3, Silicon, processes 7440-36-0, Antimony, processes 7440-38-2, Arsenic, processes 7440-69-9, Bismuth, processes 7723-14-0, Phosphorus, processes
(**dopant**; crystn. and sintering of **cubic** boron

nitride in **catalyst**-solvent-**dopant** systems
and phys. properties)

RE

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L65 ANSWER 3 OF 9 HCA COPYRIGHT 2009 ACS on STN

127:73157 Original Reference No. 127:13851a,13854a Gas-source molecular beam epitaxy of III-V nitrides. Davis, R. F.; Paisley, M. J.; Sitar, Z.; Kester, D. J.; Ailey, K. S.; Linthicum, K.; Rowland, L. B.; Tanaka, S.; Kern, R. S. (Department of Materials Science and Engineering, North Carolina State University, Raleigh, NC, 27695-7907, USA). Journal of Crystal Growth, 178(1/2), 87-101 (English) **1997**. CODEN: JCRGAE. ISSN: 0022-0248. Publisher: Elsevier.

AB Amorphous, **hexagonal** and **cubic phases** of BN were grown via ion beam assisted deposition on Si(100) substrates. Gas-source MBE of the III-V nitrides is reviewed with 86 refs. Sapphire(0001) is the most commonly employed substrate with 6H-SiC(0001), ZnO(111) and Si(111) also being used primarily for the growth of wurtzite GaN(0001) in tandem with previously deposited GaN(0001) or AlN(0001) buffer layers. Si(001), GaAs(001), GaP(001) and 3C-SiC(001) were employed for growth of **cubic** (zincblende) β-GaN(001). The precursor materials are evapd. metals and reactive N species produced either via ECR or RF plasma decompn. of N2 or from NH3. However, point defect damage from the

plasma-derived species resulted in a steady increase in the no. of investigators now using NH3. The growth temps. for wurtzite GaN have increased from 650 ± 50° to 800 ± 50° to enhance the surface mobility of the reactants and, in turn, the efficiency of decompn. of NH3 and the microstructure and the growth rate of the films. **Doping** was achieved primarily with Si (donor) and Mg (acceptor); the latter was activated without post-growth annealing. Simple heterostructures, a p-n junction LED and a modulation-**doped** field-effect transistor were achieved using GSMBE-grown material.

IT **10043-11-5**, Boron nitride (BN), processes
(gas-source MBE of)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IT **7439-95-4**, Magnesium, uses
(gas-source MBE of Group IIIA nitrides **doped** with)
RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

CC 75-0 (Crystallography and Liquid Crystals)
IT Electron acceptors
(gas-source MBE of Group IIIA nitrides **doped** with **magnesium** acceptor)
IT Electron donors
(gas-source MBE of Group IIIA nitrides **doped** with silicon donor)
IT Field effect transistors
(modulation-**doped**; gas-source MBE of III-V nitrides in fabrication of)
IT **10043-11-5**, Boron nitride (BN), processes
(gas-source MBE of)
IT **7439-95-4**, Magnesium, uses 7440-21-3, Silicon, uses
(gas-source MBE of Group IIIA nitrides **doped** with)
RE
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L65 ANSWER 4 OF 9 HCA COPYRIGHT 2009 ACS on STN

125:72187 Original Reference No. 125:13513a,13516a Recent advances in the growth, **doping**, and characterization of III-V nitride thin films. Davis, Robert F.; Ailey, K. S.; Bremser, M. D.; Carlson, E.; Kern, R. S.; Kester, D. J.; Perry, W. G.; Tanaka, S.; Weeks, T. W., Jr. (Dep. mater. Sci. Eng., North Carolina State Univ., Raleigh, NC, 27695, USA). Festkoerperprobleme, 35, 1-24 (English) **1996**. CODEN: FSTKA2. ISSN: 0430-3393. Publisher: Vieweg.

AB BN films were grown on (100) surfaces of Si and diamond via ion beam assisted deposition (IBAD) using electron beam evapn. of B together with N and Ar bombardment at substrate temps. of 200-700° and an ion flux of 0.20-0.30 mA/cm2 FTIR spectroscopy and high-resoln. TEM (HRTEM) usually showed a growth sequence of amorphous (a-

BN), **hexagonal** (**h-BN**), and **cubic** (**c-BN**) layers. This sequence was attributed to the increasing biaxial compressive stress with film thickness due to ion bombardment and some interstitial Ar incorporation. Single **phase c-BN** was obtained at substrate temps. of 200-300°. The growth mode and interfacial defects of AlN films grown on α(6H)-SiC(0001) substrates by plasma-assisted gas source MBE was investigated. At. flat AlN surfaces indicative of 2-dimensional growth were obtained using on-axis substrates and island-like features were obsd. on the vicinal surfaces. The coalescence of these features gave rise to double positioning boundaries because of the misalignment of the Si/C bilayer steps with the Al/N bilayers of the growing film; the quality of the thicker AlN films depended on the concn. of these boundaries. Monocrystalling GaN and AlxGa1-xN(0001)(0 < x < 1) films were grown via MOVPE on fresh prepd. high-temp. AlN(0001) buffer layers using Et3Ga, Et3Al, and NH3 in a cold-wall, vertical pancake-style reactor. The photoluminescence spectrum of GaN showed strong near band edge emission with a FWHM value of 4 meV. Cathodoluminescence spectra of AlxGa1-xN films for x < 0.5 also showed intense near band-edge emission. The dislocation d. within the 1st 0.5 μm was 1 + 109 cm-2; it decreased with increasing film thickness. Double-crystal x-ray rocking curves (DCXRC) indicated a FWHM value of 66 arc sec for the pure GaN(0004) reflection; this value increased with increasing x. Controlled n-type Si-**doping** of GaN was achieved for net carrier concns. ranging from 1 + 1017 cm-3 to 1 + 1020 cm-3. Si-**doped** Al0.75Ga0.25N exhibited neg. electron affinity. **Mg-doped**, p-type GaN was achieved with na-nd = 3 + 1017, ρ = 7 Ω cm and μ = 3 cm2/V s. The sections of the III-V nitrides are preceded by a survey of growth techniques and properties.

IT **7439-95-4**, Magnesium, uses
(Si- and **Mg-doping** of GaN, photo- and cathodoluminescence spectra of undoped and **doped** GaN, and elec. properties of Si:GaN)

RN 7439-95-4 HCA

CN Magnesium (CA INDEX NAME)

Mg

IT **10043-11-5**, Boron nitride, properties
(electron beam evapn. of BN on Si and diamond and its characterization by FTIR spectrometry and TEM)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 73

IT Luminescence
Luminescence, cathodo-
(Si- and **Mg-doping** of GaN and photo- and cathodoluminescence spectra of undoped and **doped** GaN)

IT Electron affinity
(electron affinity of Si-**doped** Al0.75Ga0.25N)

IT Electric property
(of Si-**doped** GaN)

IT Epitaxy
(metalorg. vapor-**phase**, MOVPE of GaN and AlxGa1-xN on AlN buffer layers, Si- and **Mg-doping** of GaN and photo- and cathodoluminescence spectra of undoped and **doped** GaN)

IT 25617-97-4, Gallium nitride 106097-44-3, Aluminum gallium nitride ((Al,Ga)N)
(MOVPE of GaN and AlxGa1-xN on AlN buffer layers, si- and **Mg-doping** of GaN, photo- and cathodoluminescence spectra of undoped and **doped** GaN, and elec. properties of Si:GaN)

IT **7439-95-4**, Magnesium, uses 7440-21-3, Silicon, uses
(Si- and **Mg-doping** of GaN, photo- and cathodoluminescence spectra of undoped and **doped** GaN, and elec. properties of Si:GaN)

IT 153809-73-5, Aluminum gallium nitride (Al3GaN4)
(electron affinity of Si-**doped**)

IT **10043-11-5**, Boron nitride, properties
(electron beam evapn. of BN on Si and diamond and its characterization by FTIR spectrometry and TEM)

L65 ANSWER 5 OF 9 HCA COPYRIGHT 2009 ACS on STN
124:267947 Original Reference No. 124:49467a,49470a Micron-size **cBN** powder produced by HP/HT synthesis. Fecioru, Marian; Dinca, Gabriel; Georgeoni, Paul; Calu, Georgeta; Baluta, Gheorghe; Deju, Marinela ("DACIA" Synthetic Diamond Factory, Bucharest, Rom.). Advances in New Diamond Science and Technology, International Conference on New Diamond Science and Technology, 4th, Kobe, Japan, July 18-22, 1994, 559-62. Editor(s): Saito, S. Scientific Publishing Division of MYU: Tokyo, Japan. (English) **1994**. CODEN: 62PAAT.

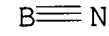
AB The feasibility of prepg. fine **cBN** powder by **catalytic** synthesis at high static pressure was investigated. The effect of process parameters, **hBN** characteristics, and type of **catalyst** on the yield, size

distribution, shape, and purity of micron-size **cBN** grit was evaluated. The properties were examd. by optical microscopy, SEM, x-ray diffraction, emission spectrophotometry, and particle size anal.

IT **10043-11-5, Boron nitride,** processes
(**cubic;** micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of phase-transfer **catalyst**)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)



CC 57-2 (Ceramics)

ST **catalyst cubic boron nitride** powder; hot pressing **hexagonal boron nitride; phase transition catalyst** boron nitride; melamine magnesium **catalyst** ; magnesium diboride nitride **catalyst;** calcium nitride lithium fluoride **catalyst;** lithium nitride **catalyst**

IT Sintering
(hot pressing, micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence **phase transition catalyst**)

IT **Catalysts** and **Catalysis**
(phase-transfer, micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

IT 12057-71-5, **Magnesium** nitride
(**admixts.** with ammonium fluoride, phase-transfer **catalysts;** micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

IT 7789-24-4, Lithium fluoride, uses
(admixts. with calcium nitride, phase-transfer **catalysts** ; micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

IT 12013-82-0, Calcium nitride (Ca3N2)
(admixts. with lithium fluoride, phase-transfer **catalysts** ; micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

IT 12125-01-8, Ammonium fluoride
(**admixts.** with **magnesium** nitride,

phase-transfer **catalysts**; micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

IT 7439-95-4, **Magnesium**, uses
(**admixts.** with melamine, phase-transfer **catalysts**; micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

IT **10043-11-5**, **Boron nitride**, processes
(**cubic**; micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of phase-transfer **catalyst**)

IT 108-78-1, Melamine, uses
(magnesium powder contg., phase-transfer **catalysts**; micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

IT 12007-25-9, Magnesium diboride 26134-62-3, Lithium nitride
(phase-transfer **catalyst**; micron-size **cBN** powder produced by hot pressing of **hexagonal boron nitride** in presence of)

L65 ANSWER 6 OF 9 HCA COPYRIGHT 2009 ACS on STN
124:161412 Original Reference No. 124:29670h,29671a Electrical properties of boron nitride thin films grown by neutralized nitrogen ion assisted vapor deposition. Lu, Ming; Bousetta, A.; Bensaoula, A.; Waters, K.; Schultz, J. A. (Space Vacuum Epitaxy Cent., Univ. Houston, Houston, TX, 77204-5507, USA). Applied Physics Letters, 68(5), 622-4 (English) **1996**. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

AB BN thin films (contg. mixed **c-BN/h-BN phase**) were deposited on Si(100) substrates using neutralized N beam and electron beam evapn. of B. All as-deposited BN films were p-type with a room-temp. carrier concn. at 5 + 1016-1 + 1017 cm-3. The **Mg-doped** BN films showed carrier concns. in the range of 1.2 + 1018 cm-3 to 5.2 + 1018 cm-3 when the Mg cell temp. was varied from 250 to 500°. The films were analyzed for both majority elements (B and N) and **dopant**/impurity (Si, **Mg**, Fe, etc.) incorporation using SIMS and mass spectroscopy of recoiled ions (MRSI). MRSI is superior for **dopant** characterization of BN thin films.

IT **7439-95-4**, Magnesium, processes
(elec. properties of boron nitride thin films grown by neutralized nitrogen ion-assisted vapor deposition)

RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

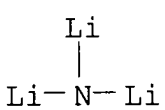
Mg

CC 76-1 (Electric Phenomena)
ST plasma CVD boron nitride elec property; hole **magnesium doping** boron nitride film
IT **7439-95-4**, Magnesium, processes
(elec. properties of boron nitride thin films grown by neutralized nitrogen ion-assisted vapor deposition)

L65 ANSWER 7 OF 9 HCA COPYRIGHT 2009 ACS on STN
119:166171 Original Reference No. 119:29645a,29648a Synthesis of **cubic boron nitride** using magnesium and pure or M'-**doped** lithium nitride, calcium nitride and magnesium nitride with M' = aluminum, boron, silicon, titanium. Bocquillon, G.; Loriers-Susse, C.; Loriers, J. (Lab. Physicochim. Mater., CNRS, Meudon, 92195, Fr.). Journal of Materials Science, 28(13), 3547-56 (English) **1993**. CODEN: JMTSAS. ISSN: 0022-2461.
AB The growth pressure temp. region of **cubic boron nitride** (**cBN**) in the systems Mg-BN and MxNy-BN (MxNy = Li3N, Ca3N2, **Mg3N2**) has been redetd. using well-crystd. **hexagonal BN** (**hBN**) with low oxygen content (0.2%) as the starting material. The data on the MxNy-BN systems are compatible with the existence of two growth regions: a high-temp. region where **cBN** grows from a liq. **phase**, and a low-temp. region where **cBN** forms from solid-solid reactions. Previous data are discussed according to this model and possible solid-state reactions are proposed on the basis of thermodn. considerations. The results for the Mg-BN system confirm the effect of the O2 content of the starting BN on the **cBN** growth region. The systems (MxNy + M')-BN (M' = Al, B, Si, Ti) produce **cBN** crystals of increased size and improved morphol. (more compact and perfect) compared to those obtained with the MxNy-BN systems. Their color is dark or black and their size reaches 0.6 mm. The effect of the relative proportions of M' and MxNy on the growth region and yield has been detd. and is discussed on the basis of the chem. reactions likely to occur.
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, prepn. of, in magnesium and pure or **doped** lithium nitride and calcium nitride and magnesium nitride systems)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
26134-62-3, Lithium nitride Li3N
(systems, **hexagonal boron nitride**-, **cubic boron nitride** formation in)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **7439-95-4**, Magnesium, properties
(systems, **hexagonal boron nitride**-, **cubic boron nitride** formation in)
RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

CC 57-2 (Ceramics)
Section cross-reference(s): 49
ST **cubic boron nitride** prepn; magnesium system **cubic boron nitride** prepn; lithium nitride system boron nitride prepn; calcium nitride system boron nitride prepn
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, prepn. of, in magnesium and pure or **doped** lithium nitride and calcium nitride and magnesium nitride systems)
IT 7429-90-5, Aluminum, uses 7440-21-3, Silicon, uses 7440-32-6, Titanium, uses 7440-42-8, Boron, uses
(**dopant**, in **hexagonal boron nitride** system, **cubic-phase** crystal size and morphol. in relation to)
IT 12013-82-0, Calcium nitride Ca3N2 **12057-71-5**, Magnesium nitride (**Mg3N2**) **26134-62-3**, Lithium nitride Li3N
(systems, **hexagonal boron nitride**-, **cubic boron nitride** formation in)
IT **7439-95-4**, Magnesium, properties
(systems, **hexagonal boron nitride**-, **cubic boron nitride** formation in)

L65 ANSWER 8 OF 9 HCA COPYRIGHT 2009 ACS on STN

118:65431 Original Reference No. 118:11529a,11532a Manufacture of polycrystalline **cubic boron nitride** from graphitic boron nitride in the absence of bulk-**catalytic** material, and the boron nitride obtained. Corrigan, Francis Raymond (General Electric Co., USA). Eur. Pat. Appl. EP 512762 A2 **19921111**, 7 pp. DESIGNATED STATES: R: AT, BE, CH, DE, FR, GB, LI, SE. (English). CODEN: EPXXDW. APPLICATION: EP 1992-303949 19920430. PRIORITY: US 1991-695380 19910503.

AB The process comprises **doping** the graphitic (**hexagonal**, pyrolytic) **BN** (GBN, **HBN**, PBN) with .ltorsim.50 wt.% non-BN atoms or atom clusters, an amt. of which being included in the **cubic BN** (**CBN**) lattice, to lower the high-pressure conditions required in the manuf. of **CBN** in the absence of those atoms or atom clusters. Zr-**doped HBN** samples were hot pressed at at 1800° and 65 kbar and showed complete conversion, vs. partial conversion at 60 kbar and complete conversion for undoped **HBN** at 68 kbar.

IT **7439-95-4**, **Magnesium**, uses **12795-15-2**, **Magnesium** boride **26134-62-3**, Lithium nitride **56127-34-5**, **Magnesium** nitride
(**dopant**, in **hexagonal-cubic phase transition** of boron nitride, for decreased pressure)

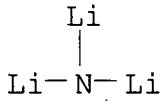
RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

RN 12795-15-2 HCA
CN Magnesium boride (CA INDEX NAME)

Component	Ratio	Component Registry Number
B	x	7440-42-8
Mg	x	7439-95-4

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



RN 56127-34-5 HCA
CN Magnesium nitride (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	x	17778-88-0
Mg	x	7439-95-4

IT **10043-11-5P**, Boron nitride, preparation
(manuf. of **cubic**, from graphitic **boron nitride**, **dopants** for **phase transition** in, for decreased pressure)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

IC ICM C04B035-58
CC 57-2 (Ceramics)
ST boron nitride **phase transition dopant**; **hexagonal cubic phase transition** ; zirconium **dopant phase transition**; silicon **dopant phase transition**; titanium **dopant phase transition**
IT Group IVA elements
Group VA elements
Group VIA elements
Transition metals, uses
(**dopants**, in **hexagonal-cubic phase transition** of boron nitride, for decreased pressure)
IT **Phase transition**
(**hexagonal-cubic**, of boron, **dopants** for, for decreased pressure)
IT 7429-90-5, Aluminum, uses **7439-95-4**, **Magnesium**, uses 7440-21-3, Silicon, uses 7440-32-6, Titanium, uses 7440-44-0, Carbon, uses 7440-67-7, Zirconium, uses 12070-08-5, Titanium carbide 12619-90-8, Nickel boride **12795-15-2**, **Magnesium** boride 25583-20-4, Titanium nitride **26134-62-3**, Lithium nitride 37367-77-4, Aluminum boride **56127-34-5**, **Magnesium** nitride
(**dopant**, in **hexagonal-cubic phase transition** of boron nitride, for decreased pressure)
IT **10043-11-5P**, Boron nitride, preparation
(manuf. of **cubic**, from graphitic **boron**

nitride, dopants for **phase transition** in, for decreased pressure)

L65 ANSWER 9 OF 9 HCA COPYRIGHT 2009 ACS on STN
93:49538 Original Reference No. 93:8175a,8178a Effect of process parameters and **dopants** in the synthesis on the mechanical properties of diamond grains and **cubic boron nitride**. Drexler, J.; Kupcik, F. (Vyzkum. Ustav Praskovou Metal., Sumperk, Czech.). Medzinar. Konf. Praskovej Metal., [Zb. Prednasok], 5th, Volume 1, 219-40. Slov. Akad. Vied, Ustav Exp. Metal.: Kosice, Czech. (Czech) **1978**. CODEN: 42SXAN.

AB The effects of temp. and pressure on both the graphite to diamond and the **hexagonal** to **cubic B nitride** conversion are similar, the conversion degrees and the **phase transformation** rates increasing with the increasing pressure. Graphite was converted to diamond in the presence of Ni-Mn solvent at 5.2-6.5 GPa and 1500-2000 K. Max. conversion is in the region of Ni:Mn wt. ratio of .apprx.1, whereas min. conversion values are obsd. in the regions of the Ni2Mn and NiMn2 intermetallic compd. formation. **Hexagonal B nitride** was converted to the **cubic** form in a mixt. with Mg at 5.2-5.8 GPa in the Belt high-pressure device. The grain size and mech. properties of both products decrease with increasing pressure at which the conversion takes place, as the pressure aids in the no. of the cryst. nuclei formed increase. The grain size and mech. properties can be improved through the use of additives, the compn. and amt. of which, however, are not specified.

IT **7439-95-4**, uses and miscellaneous
(in **boron nitride hexagonal-to-cubic** transformation)
RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

IT **10043-11-5P**, preparation
(prepn. of **cubic**, from **hexagonal** form, **dopants** and process parameters in relation to)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 49-5 (Industrial Inorganic Chemicals)
ST diamond prepn; graphite diamond transformation; manganese nickel solvent **catalyst**; boron nitride cryst transformation;

magnesium **catalyst**
IT 37233-01-5
(**catalyst** and solvent, in diamond prepn. from graphite)
IT **7439-95-4**, uses and miscellaneous
(in **boron nitride hexagonal**-to-**cubic** transformation)
IT **10043-11-5P**, preparation
(prepn. of **cubic**, from **hexagonal** form, **dopants** and process parameters in relation to)
IT 7782-40-3P, preparation
(prepn. of, from graphite, **dopants** and process parameters in relation to)

=> D L66 1-15 CBIB ABS HITSTR HITIND RE

L66 ANSWER 1 OF 15 HCA COPYRIGHT 2009 ACS on STN
137:281453 Manufacture of **cubic boron nitride** from **hexagonal boron nitride**.. Iizuka, Makoto (Showa Denko K. K., Japan). Jpn. Kokai Tokkyo Koho JP 2002284511 A **20021003**, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-89029 20010327.
AB In title process including keeping **hexagonal BN** (**h-BN**) in thermal dynamically stable region of **cubic BN** (**c-BN**) in the presence of **catalyst** for transformation of **h-BN** to **c-BN**, the **catalyst** is selected from ≥ 1 of LiMBN2 (where M is Ca, Sr, Ba, Ra, Be or Mg), and alkali metal, alk. earth metal and their nitride or boronitride. In addn., the oxygen content of the LiMBN2 is ≤ 1 %; the oxygen content of the alkali metal, alk. earth metal, and their nitride or boronitride is ≤ 1 %. The LiMBN2 is LiCaBN2 and/or LiBaBN2. The alkali metal boronitride is Li3BN2. The alk. earth metal boronitride is Ca3B2N4. The **catalyst** contains LiCaBN2 and Li3BN2. Grinding wheels made of the manufd. **c-BN** is claimed.
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**; manuf. of **cubic boron nitride** from **hexagonal boron nitride**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IT **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium, uses **12057-71-5**, Magnesium nitride (Mg3N2)

12408-97-8 26134-62-3, Lithium nitride (Li3N)
87354-58-3, Calcium lithium boride nitride (CaLiBN2)
461638-65-3, Barium boron lithium nitride (BaBLiN2)
(manuf. of **cubic boron nitride** from **hexagonal boron nitride**)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

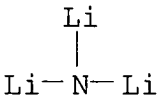
Mg

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 12408-97-8 HCA
CN Boranamine, 1-imino-, trilithium salt (9CI) (CA INDEX NAME)

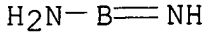
$H_2N-B{=}NH$

●3 Li

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



RN 87354-58-3 HCA
CN Boranamine, 1-imino-, calcium lithium salt (1:1:1) (9CI) (CA INDEX NAME)



RN 461638-65-3 HCA
CN Barium boron lithium nitride (BaBLiN2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	2	17778-88-0
B	1	7440-42-8
Ba	1	7440-39-3
Li	1	7439-93-2

IC ICM C01B021-064
ICS B01J003-00; B01J027-24; C09K003-14
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 57, 67
ST **cubic boron nitride** manuf **catalyst; hexagonal boron nitride** transformation **cubic boron nitride** manuf **catalyst**
IT **Catalysts**
Phase transfer **catalysts**
Structural **phase transition**
(manuf. of **cubic boron nitride** from **hexagonal boron nitride**)
IT Grinding wheels
(prodn. of **cubic boron nitride** from **hexagonal boron nitride** for)
IT **10043-11-5P, Boron nitride**, preparation
(**cubic**; manuf. of **cubic boron nitride** from **hexagonal boron nitride**)
IT **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium, uses **12057-71-5**, Magnesium nitride (Mg3N2) **12408-97-8 26134-62-3**, Lithium nitride (Li3N) 29285-24-3, Potassium nitride (K3N) 65453-51-2, Calcium boride

nitride (Ca3B2N4) **87354-58-3**, Calcium lithium boride nitride (CaLiBN2) **461638-65-3**, Barium boron lithium nitride (BaBLiN2)
(manuf. of **cubic boron nitride** from **hexagonal boron nitride**)

L66 ANSWER 2 OF 15 HCA COPYRIGHT 2009 ACS on STN
137:267127 Method for manufacturing **cubic boron nitride**. Iizuka, Makoto (Showa Denko K.K., Japan). PCT Int. Appl. WO 2002076906 A2 **20021003**, 25 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-JP2987 20020327. PRIORITY: JP 2001-89029 20010327; US 2001-280749P 20010403.

AB A method for producing **c-boron nitride** includes maintaining **h-boron nitride** in the presence of a **catalyst** substance under conditions where **cubic boron nitride** remains thermodynamically stable to thereby transform **hexagonal boron nitride** into **cubic boron nitride**, wherein the **catalyst** substance contains LiMBN2, in which M represents Ca, Sr, Ba, Ra, Be, or Mg, and at least one species selected from the group consisting of alkali metals, alk. earth metals, nitrides thereof and boronitrides thereof. Any one of the LiMBN2, alkali metals, alk. earth metals, nitrides thereof and boronitrides thereof has an oxygen content of ≤1 %. The percent transformation into **cubic boron nitride** can be considerably enhanced, and the **cubic boron nitride** obtained exhibits high mech. strength.

IT **10043-11-5**, **Boron nitride**, processes
(**cubic** an **hexagonal** crystal structure; method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IT **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium,

uses **12057-71-5**, Magnesium nitride (Mg3N2)
12408-97-8 12521-66-3 26134-62-3,
Lithium nitride (Li3N) **71330-55-7**, Magnesium boride
nitride (Mg3B2N4) **87354-58-3**, Calcium lithium boride
nitride (CaLiBN2) **161565-26-0**, Boron lithium magnesium
nitride (BLiMgN2) **461638-64-2**, Boron lithium strontium
nitride (BLiSrN2) **461638-65-3**, Barium boron lithium
nitride (BaBLiN2) **461638-66-4**, Lithium radium boride
nitride (LiRaBN2) **461638-67-5**, Beryllium boron lithium
nitride (BeBLiN2)
(method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**
)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

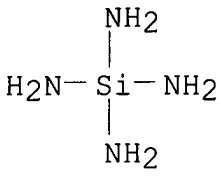
Mg

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 12408-97-8 HCA
CN Boranamine, 1-imino-, trilithium salt (9CI) (CA INDEX NAME)

$H_2N-B{=}NH$

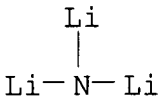
●3 Li

RN 12521-66-3 HCA
CN Silanetetramine, octalithium salt (9CI) (CA INDEX NAME)



●8 Li

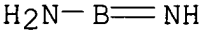
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



RN 71330-55-7 HCA
CN Boranamine, 1-imino-, magnesium salt (2:3) (9CI) (CA INDEX NAME)

●3/2 Mg

RN 87354-58-3 HCA
CN Boranamine, 1-imino-, calcium lithium salt (1:1:1) (9CI) (CA INDEX NAME)



● Ca

● Li

RN 161565-26-0 HCA
CN Boron lithium magnesium nitride (BLiMgN2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	2	17778-88-0
B	1	7440-42-8
Mg	1	7439-95-4
Li	1	7439-93-2

RN 461638-64-2 HCA
CN Boron lithium strontium nitride (BLiSrN2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	2	17778-88-0
B	1	7440-42-8
Sr	1	7440-24-6
Li	1	7439-93-2

RN 461638-65-3 HCA
CN Barium boron lithium nitride (BaBLiN2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	2	17778-88-0
B	1	7440-42-8
Ba	1	7440-39-3
Li	1	7439-93-2

RN 461638-66-4 HCA
CN Lithium radium boride nitride (LiRaBN2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	2	17778-88-0
B	1	7440-42-8
Ra	1	7440-14-4
Li	1	7439-93-2

RN 461638-67-5 HCA
CN Beryllium boron lithium nitride (BeBLiN2) (CA INDEX NAME)

Component	Ratio	Component Registry Number

N	2	17778-88-0
B	1	7440-42-8
Be	1	7440-41-7
Li	1	7439-93-2

IC ICM C04B035-5831
CC 57-2 (Ceramics)
Section cross-reference(s): 67
ST **cubic boron nitride** synthesis
hexagonal crystal structure transition strength
IT Nitrides
(boronitrides; method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)
IT Crystal structure types
(**cubic, boron nitride**; method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)
IT Crystal structure types
(**hexagonal, boron nitride**; method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)
IT Abrasives
Catalysts
Cutting tools
Particle size
Phase transition
Strength
(method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)
IT Alkali metals, uses
Alkaline earth metals
(method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)
IT **10043-11-5, Boron nitride**, processes
(**cubic** an **hexagonal** crystal structure; method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)
IT **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium, uses **12057-71-5**, Magnesium nitride (Mg3N2) **12408-97-8** 12514-90-8 **12521-66-3** **26134-62-3**, Lithium nitride (Li3N) 29285-24-3, Potassium nitride (K3N) 65453-51-2, Calcium boride nitride (Ca3B2N4)

71330-55-7, Magnesium boride nitride (Mg3B2N4)
87354-58-3, Calcium lithium boride nitride (CaLiBN2)
161565-26-0, Boron lithium magnesium nitride (BLiMgN2)
461638-64-2, Boron lithium strontium nitride (BLiSrN2)
461638-65-3, Barium boron lithium nitride (BaBLiN2)
461638-66-4, Lithium radium boride nitride (LiRaBN2)
461638-67-5, Beryllium boron lithium nitride (BeBLiN2)
(method for manufg. **c-BN** by **catalytic phase transformation** of **h-BN**)

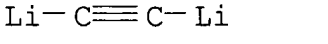
RE
(1) Anon; US 4551316 A HCA

L66 ANSWER 3 OF 15 HCA COPYRIGHT 2009 ACS on STN
130:354316 Alkali metal and alkaline earth metal compounds in preparation of **cubic boron nitride** from **hexagonal boron nitride**. Shioi, Kousuke; Ihara, Eiji (Showa Denko K. K., Japan). Ger. Offen. DE 19854487 A1 **19990527**, 10 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1998-19854487 19981125. PRIORITY: JP 1997-323352 19971125.

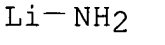
AB A process for conversion of **hexagonal boron nitride** into **cubic boron nitride**, in which the **hexagonal boron nitride** is subjected to temp. and pressure conditions favoring stability of **cubic** nitride in the presence of at least one compd. chosen from alkali and alk. earth amides, imides, and carbides, as well as a silicon source and/or a boron source. Preferred amides and carbides are LiNH2 and CaC2.

IT **1070-75-3**, Lithium acetylide (Li2(C2)) **7782-89-0**, Lithium amide (LiNH2) **7803-54-5**, Magnesium amide (Mg(NH2)2 **12122-46-2**, Magnesium carbide **12135-01-2**, Lithium imide (Li2(NH)) **26134-80-5**, Magnesium imide (MgNH)
(additive; alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)

RN 1070-75-3 HCA
CN Lithium acetylide (Li2(C2)) (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



RN 7782-89-0 HCA
CN Lithium amide (Li(NH2)) (CA INDEX NAME)



RN 7803-54-5 HCA
CN Magnesium amide (Mg(NH2)2) (7CI, 8CI, 9CI) (CA INDEX NAME)

$H_2N-Mg-NH_2$

RN 12122-46-2 HCA
CN Magnesium acetylide (Mg(C2)) (CA INDEX NAME)

RN 12135-01-2 HCA
CN Lithium imide (Li2(NH)) (9CI) (CA INDEX NAME)

Li—NH—Li

RN 26134-80-5 HCA
CN Magnesium imide (Mg(NH)) (9CI) (CA INDEX NAME)

Mg═NH

IT **10043-11-5P, Boron nitride,** preparation
(**cubic;** alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IC ICM C01B021-064
ICS C30B029-38; C30B001-12
CC 49-8 (Industrial Inorganic Chemicals)
ST **cubic boron nitride phase transition; hexagonal cubic boron nitride phase transition** ; alkali amide carbide boron nitride **phase transition**
IT Organometallic compounds
(acetylides; alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)
IT Alkali metal compounds

Alkaline earth compounds
(amides, imides, and carbides; alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)

IT Structural **phase transition**
(**hexagonal**-to-**cubic**; alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)

IT 75-20-7, Calcium carbide **1070-75-3**, Lithium acetylide (Li2(C2)) 7440-21-3, Silicon, uses 7440-42-8, Boron, uses **7782-89-0**, Lithium amide (LiNH2) **7803-54-5**, Magnesium amide (Mg(NH2)2 **12122-46-2**, Magnesium carbide **12135-01-2**, Lithium imide (Li2(NH)) 12400-28-1, Calcium imide (CaNH) 23321-74-6, Calcium amide (Ca(NH2)2 **26134-80-5**, Magnesium imide (MgNH)
(additive; alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)

IT 7664-41-7D, Ammonia, alkali and alk. earth metal salts, uses 34846-56-5D, Acetylide (C22-), alkali and alk. earth metal salts
(additives; alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)

IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**; alkali metal and alk. earth metal compds. in prepn. of **cubic boron nitride** from **hexagonal boron nitride**)

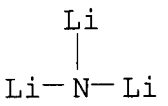
L66 ANSWER 4 OF 15 HCA COPYRIGHT 2009 ACS on STN
129:125644 Original Reference No. 129:25663a,25666a Boron nitride revisited. Will, G.; Nover, G.; Von Der Gonna, J. (Mineralogical Institute, Bonn University, Bonn, Germany). Koatsuryoku no Kagaku to Gijutsu, 7(Proceedings of International Conference--AIRAPT-16 and HPCJ-38--on High Pressure Science and Technology, 1997), 975-979 (English) **1998**. CODEN: KKGIE2. ISSN: 0917-639X. Publisher: Nippon Koatsuryoku Gakkai.

AB The **phase** diagram published by Bundy & Wentorf already shows **cBN** to be the stable form of boron nitride, in contrast to similar diagrams used today. This picture is supported by theor. calcns. by Maki et al. and Solozhenko. Results of compressibility measurements for **cBN** and **hBN** are presented. To clarify the picture of the **phase** diagram the **transformation** from **hBN** to **cBN** was studied in a series of time dependent diffraction expts. using synchrotron radiation. The crystn. is found to go through the melt. In a second series of expts. the back-transformation of **cBN**

to **hBN** was studied. Finally the exptl. conditions for high pressure/ high temp. synthesis of **cBN** could be lowered to 2.5 GPa at 1800° using amorphous boron nitride as starting material.

IT **26134-62-3P**, Lithium nitride (Li3N) **67182-71-2P**, Lithium boride nitride **71330-55-7P**, Magnesium boride nitride (Mg3B2N4)
(synthesis of boron nitride and **phase** diagram studies)

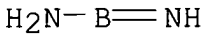
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



RN 67182-71-2 HCA
CN Lithium boride nitride (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	x	17778-88-0
B	x	7440-42-8
Li	x	7439-93-2

RN 71330-55-7 HCA
CN Boranamine, 1-imino-, magnesium salt (2:3) (9CI) (CA INDEX NAME)



●3/2 Mg

CC 56-9 (Nonferrous Metals and Alloys)
ST boron nitride synthesis compressibility **phase** diagram
IT Compressibility
Crystallization
Phase diagram
Synchrotron radiation
Synthesis
(synthesis of boron nitride and **phase** diagram studies)
IT Metallic glasses
(synthesis of boron nitride and **phase** diagram studies)
IT 10043-11-5P, Boron nitride (BN), preparation **26134-62-3P**, Lithium nitride (Li3N) **67182-71-2P**, Lithium boride nitride

71330-55-7P, Magnesium boride nitride (Mg3B2N4)
(synthesis of boron nitride and **phase** diagram studies)

RE
(1) Bundy, F; No publication given 1963, V38, P1144 HCA
(2) Colburn, N; J Chem Phys 1968, V48, P555
(3) Corrigan, F; No publication given 1975, V63, P3812 HCA
(4) de Vries, R; J Crystal Growth 1972, V13/14, P88
(5) Kurdyumov, A; Sov Phys Crystallogr 1972, V17, P534
(6) Lynch, R; J Chem Phys 1966, V44, P181 HCA
(7) Maki, J; Proceedings II Int Conf On New Diamonds Science and Technology 1991, P1051 HCA
(8) Murnaghan, F; Proc Nat Acad Sci 1944, V30, P244 MEDLINE
(9) Singh, B; Diamond and Related Materials 1995, V4, P1193 HCA
(10) Singh, B; J Crystal Growth 1995, V125, P143
(11) Solozhenko, V; Diamond and Related Materials 1994, V4, P1 HCA
(12) Solozhenko, V; High Pressure Research 1995, V13, Pxx
(13) Solozhenko, V; Proceedings of the XV AIRAPT & XXXIII EHPRGG International Conference 1995, P405
(14) Solozhenko, V; Solid State Communications 1994, V90, P65 HCA
(15) Solozhenko, V; Solid State Communications 1995, V96, P1 HCA
(16) Solozhenko, V; XXXII Annual meeting EHPRG, High pressure in Material Science and Geoscience 1994, P57
(17) Von der Gonna, J; Solid State Communications, in Press
(18) Wentorf, R; J Chem Phys 1961, V34, P809 HCA
(19) Wildenburg, J; US 5230873 HCA

L66 ANSWER 5 OF 15 HCA COPYRIGHT 2009 ACS on STN
128:40127 Original Reference No. 128:7771a,7774a In-situ investigations of the reversible **hBN-cBN-hBN** -transformation in the Li3N-BN **catalyst** system using synchrotron radiation. von der Gonna, J.; Meurer, H. J.; Nover, G.; Peun, T.; Schonbohm, D.; Will, G. (Poppelsdorfer Schloss, Mineralogisches Institut der Universitat Bonn, Bonn, Germany). Materials Letters, 33(5,6), 321-326 (English) **1998**. CODEN: MLETDJ. ISSN: 0167-577X. Publisher: Elsevier Science B.V..

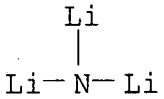
AB The kinetics of the transformation of **boron nitride**'s **hexagonal** form (**hBN**) into the polymorphic **cubic** high pressure phase (**cBN**) were studied in the Li3N-BN **catalyst** system under in-situ pressure and temp. conditions. Energy-dispersive X-ray expts. were performed in a MAX 80 high pressure cell at HASYLAB, DESY, Hamburg using synchrotron radiation. The transformation of **hBN** into **cBN** and the reverse transformation of **cBN** into **hBN** within the same exptl. run were examd. Simultaneously the kinetics of the transformation were detd. in the pressure range 0.65-6.5 GPa and at temps. between 600-1400°C. It could be shown that, in most cases, the transformation was rather fast and it was completed in less than 5 min. The obsd. data

confirm the exptl. results and the phase diagram as given by Bundy and Wentorf, but are in contrast to the exptl. results and thermodn. calcns. by Solozhenko and by Maki.

IT **10043-11-5**, Boron nitride(bn), uses **26134-62-3**, Lithium nitride(Li3N)
(in-situ investigations of reversible **hBN-cBN -hBN**-transformation in Li3N-BN **catalyst** system using synchrotron radiation)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



CC 67-3 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
Section cross-reference(s): 71

ST boron nitride structural **phase transition; catalyst** lithium nitride boron nitride; synchrotron radiation study boron nitride phase

IT **Catalysts**
Physical process kinetics
Structural **phase transition**
(in-situ investigations of reversible **hBN-cBN -hBN**-transformation in Li3N-BN **catalyst** system using synchrotron radiation)

IT **10043-11-5**, Boron nitride(bn), uses **26134-62-3**, Lithium nitride(Li3N)
(in-situ investigations of reversible **hBN-cBN -hBN**-transformation in Li3N-BN **catalyst** system using synchrotron radiation)

L66 ANSWER 6 OF 15 HCA COPYRIGHT 2009 ACS on STN
126:205751 Original Reference No. 126:39655a Manufacture of **cubic boron nitride** from **hexagonal** one. Shioi, Tsunesuke; Masuda, Tomoyuki; Nakano, Hidefumi (Showa Denko Kk, Japan). Jpn. Kokai Tokkyo Koho JP 09000910 A **19970107** Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1995-144382 19950612.

AB The title method comprises conversion of **hexagonal**

BN to **cubic** in the presence of (A) ≥1 selected from amide and imides of alkali metals and alk.-earth metals, (B) ≥1 selected from hydrides of alkali metals and alk.-earth metals, and optionally (C) ≥1 selected from alkali metals and alk.-earth metals under keeping the temp. and pressure in the stable region for **cubic BN**. The method gives **cubic BN** with sharp edges under milder condition to be useful for whetstones.

IT **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium, uses **7580-67-8**, Lithium hydride **7693-27-8**, Magnesium hydride **7782-89-0**, Lithium amide **7803-54-5**, Magnesium amide (Mg(NH2)2) **12135-01-2**, Lithium imide
(manuf. of **cubic boron nitride** from **hexagonal** one)

RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

RN 7580-67-8 HCA
CN Lithium hydride (LiH) (CA INDEX NAME)

LiH

RN 7693-27-8 HCA
CN Magnesium hydride (MgH2) (CA INDEX NAME)

MgH_2

RN 7782-89-0 HCA
CN Lithium amide (Li(NH2)) (CA INDEX NAME)

$Li-NH_2$

RN 7803-54-5 HCA
CN Magnesium amide (Mg(NH2)2) (7CI, 8CI, 9CI) (CA INDEX NAME)

$H_2N-Mg-NH_2$

RN 12135-01-2 HCA
CN Lithium imide (Li2(NH)) (9CI) (CA INDEX NAME)

Li—NH—Li

IT **10043-11-5**, Boron nitride, processes
(manuf. of **cubic boron nitride** from **hexagonal** one)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IC ICM B01J003-06
CC 75-1 (Crystallography and Liquid Crystals)
ST **boron nitride hexagonal cubic** conversion; crystal **phase transition** boron nitride; alkali metal amide **cubic boron nitride**; imide alk earth **cubic boron nitride**
IT Crystallization
Structural **phase transition**
(manuf. of **cubic boron nitride** from **hexagonal** one)
IT Abrasives
(whetstones; manuf. of **cubic boron nitride** from **hexagonal** one)
IT **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium, uses 7440-70-2, Calcium, uses **7580-67-8**, Lithium hydride **7693-27-8**, Magnesium hydride **7782-89-0**, Lithium amide 7782-92-5, Sodium amide 7789-78-8, Calcium hydride **7803-54-5**, Magnesium amide (Mg(NH2)2) **12135-01-2**, Lithium imide 12400-28-1, Calcium imide 17242-52-3, Potassium amide 23321-74-6, Calcium amide 88676-47-5, Sodium imide (Na2(NH)) 187810-78-2, Lithium imide (K2(NH))
(manuf. of **cubic boron nitride** from **hexagonal** one)
IT **10043-11-5**, Boron nitride, processes
(manuf. of **cubic boron nitride** from **hexagonal** one)

L66 ANSWER 7 OF 15 HCA COPYRIGHT 2009 ACS on STN
126:150690 Original Reference No. 126:29029a Kinetic features of

crystallization of **cubic boron nitride** single crystals in the BN-LiH(N,Se) system. Gameza, L. M.; Shipilo, V. B.; Savchuk, V. A. (Institut Solid State Semiconductor Physics, Minsk, 220726, Belarus). Physica Status Solidi B: Basic Research, 198(1), 559-563 (English) **1996**. CODEN: PSSBBD. ISSN: 0370-1972. Publisher: Akademie Verlag.

AB The effect of Se addns. on the kinetics of the degree and rate of **hexagonal** to **cubic BN** conversion (**hBN** → **cBN**) as well as on the linear rate of the **cBN** crystal growth in the BN-LiH(N,Se) system was investigated. Expts. were performed at 1940-2080 K and 4.3 GPa. For 0.5, 1.0, and 3.0 % Se addn., the activation energy of the process of **cBN** formation is 45.0, 39.0, and 34.0 kJ/mol, resp. The resulting crystals showed n-type conduction with a resistivity of 105-108 Ω cm and a dislocation d. of 105-103 cm-2.

IT **7580-67-8**, Lithium hydride
(**catalyst** for crystal growth of **cubic boron nitride** and **phase transition** of **hexagonal BN** → **cubic BN** in **BN**-LiH(N,Se) system)

RN 7580-67-8 HCA

CN Lithium hydride (LiH) (CA INDEX NAME)

LiH

IT **10043-11-5**, Boron nitride, properties
(crystal growth kinetics of **cubic boron nitride** and **phase transition** kinetics of **hexagonal BN** → **cubic BN** in **BN**-LiH(N,Se) system)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76

ST crystal growth kinetics **cubic boron nitride**; selenium **phase transition** kinetics boron nitride; resistance dislocation density **cubic boron nitride**

IT Electric resistance
(of **cubic boron nitride** crystals obtained from crystal growth and **hexagonal BN** → **cubic BN phase**

transition in BN-LiH(N,Se) system)
IT Activation energy
(of **cubic boron nitride** formation
in presence of selenium)
IT Crystal growth kinetics
(of **cubic boron nitride** in
BN-LiH(N,Se) system)
IT Structural **phase transition**
(of **hexagonal boron nitride**
→ **cubic boron nitride** in
BN-LiH(N,Se) system)
IT **7580-67-8**, Lithium hydride
(**catalyst** for crystal growth of **cubic**
boron nitride and **phase**
transition of **hexagonal BN** →
cubic BN in **BN**-LiH(N,Se) system)
IT **10043-11-5**, Boron nitride, properties
(crystal growth kinetics of **cubic boron**
nitride and **phase transition** kinetics
of **hexagonal BN** → **cubic**
BN in **BN**-LiH(N,Se) system)
IT 7782-49-2, Selenium, processes
(effect on crystal growth kinetics of **cubic**
boron nitride and **phase**
transition kinetics of **hexagonal BN**
→ **cubic BN** in **BN**-LiH(N,Se)
system)

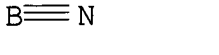
L66 ANSWER 8 OF 15 HCA COPYRIGHT 2009 ACS on STN
124:350220 Original Reference No. 124:64889a,64892a Growth mechanism of **cBN** crystals under high pressure and high temperature.
Zhou, Yanping; Yan, Xuewei; Ma, Xianfeng; Zhao, Tinghe (Changchun Inst. of Applied Chem., Chinese Academy of Sci., Changchun, 130022, Peop. Rep. China). Wuji Cailiao Xuebao, 10(4), 391-8 (Chinese) **1995**. CODEN: WCXUET. ISSN: 1000-324X. Publisher: Kexue.
AB **Cubic boron nitride** was synthesized under the conditions of high pressure (4.5-5.0 GPa) and the high temp. of 1500-1800°C. Two types of **cubic** (**c**)**BN**, synthesized in the Li-complex nitride or boride-nitride **catalytic** systems and in the same **catalytic** system with additive complex nitride Li8SiN4, were compared. The surface structure and growth mechanism of **cBN** crystals were discussed. The behavior of Si in the **phase transformation** from **hexagonal** (**h**) **BN** to **cBN** was studied. When complex nitride Li8SiN4 was added to the **catalytic** system, its partial dissoln. increased the satn. degree and the viscosity of melt, which increased crystal boundary energy and decreased nucleation rate.

The glossy transparent **cBN** crystals having brown luster were synthesized.

IT **10043-11-5P, Boron nitride,** preparation (**cubic;** effects of Li8SiN4 additive on the growth mechanism of **cubic BN** crystals from **hexagonal BN** under high pressure and high temp.)

RN 10043-11-5 HCA

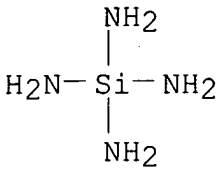
CN Boron nitride (BN) (CA INDEX NAME)



IT **12521-66-3,** Lithium silicon nitride (Li8SiN4) (effects of Li8SiN4 additive on the growth mechanism of **cubic BN** crystals from **hexagonal BN** under high pressure and high temp.)

RN 12521-66-3 HCA

CN Silanetetramine, octalithium salt (9CI) (CA INDEX NAME)



CC 57-2 (Ceramics)

ST **cubic boron nitride** crystal growth mechanism

IT **10043-11-5P, Boron nitride,** preparation (**cubic;** effects of Li8SiN4 additive on the growth mechanism of **cubic BN** crystals from **hexagonal BN** under high pressure and high temp.)

IT **12521-66-3,** Lithium silicon nitride (Li8SiN4) (effects of Li8SiN4 additive on the growth mechanism of **cubic BN** crystals from **hexagonal BN** under high pressure and high temp.)

L66 ANSWER 9 OF 15 HCA COPYRIGHT 2009 ACS on STN

124:13785 Original Reference No. 124:2653a,2656a Modification of mechanical properties of nitrogen-sputtered boron nitride films by ion bombardment. Jensen, H.; Jensen, U. M.; Sorensen, G. (Inst.

Phys. Astronomy, Aarhus Univ., Aarhus, 8000-DK, Den.). Surface and Coatings Technology, 74-75(1-3, Pt. 2), 781-7 (English) **1995** . CODEN: SCTEEJ. ISSN: 0257-8972. Publisher: Elsevier.

AB Boron nitride is a fascinating coating material, both in the electronics industry and for tribol. applications. For the various applications the cryst. structure is important, and there is a need for studies of its basic nature and of its surface modification by ion beams. A large variety of high temp. processes for prodn. of boron nitride exists, whereas there are only a few reports on low temp. processes, such as reactive r.f. sputtering. In these cases, only boron nitride targets have been used and usually in argon-nitrogen sputtering mixts. The authors of the present paper have, however, shown that boron nitride can be deposited by a reactive nitrogen-sputtering process from a boron metal target without argon at all. The acoustic scratch test technique was used as a kind of mech. test for nitrogen-sputtered BN deposited on cemented carbide. The effect of a neg. substrate bias and sputter gas mixts. of nitrogen and krypton was studied. Although nitrogen-krypton sputter gas mixts. had only a marginal effect on sputter rates, they had a significant effect on the mech. film properties. A post-ion bombardment of nitrogen-sputtered BN coatings with nitrogen ions in the hundreds of kiloelectronvolts range was also effective for modification of the mech. properties. The possibility of ion implanting a lithium **catalyst** for a cryst. transformation from **hexagonal** to **cubic** cryst. structure was discussed, and lithium ion implantation did show a modification of surface friction properties. This novel process of nitrogen sputtering of boron may improve understanding of the fundamental aspects of phase control in the deposition of boron nitride films.

IT **7439-93-2**, Lithium, processes
(**catalyst**, implantation ion; effects of lithium implantation **hexagonal** to **cubic phase transformation** and friction properties of boron nitride coatings prepd. by reactive nitrogen sputtering from boron targets)

RN 7439-93-2 HCA

CN Lithium (CA INDEX NAME)

Li

IT **10043-11-5**, Boron nitride, processes
(coatings; effects of ion bombardment on mech. properties of boron nitride coatings prepd. by reactive nitrogen sputtering from boron targets)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-2 (Ceramics)
IT Friction
(effects of lithium implantation **hexagonal** to **cubic phase transformation** and friction properties of boron nitride coatings prepd. by reactive nitrogen sputtering from boron targets)
IT **7439-93-2**, Lithium, processes
(**catalyst**, implantation ion; effects of lithium implantation **hexagonal** to **cubic phase transformation** and friction properties of boron nitride coatings prepd. by reactive nitrogen sputtering from boron targets)
IT **10043-11-5**, Boron nitride, processes
(coatings; effects of ion bombardment on mech. properties of boron nitride coatings prepd. by reactive nitrogen sputtering from boron targets)

L66 ANSWER 10 OF 15 HCA COPYRIGHT 2009 ACS on STN
122:110152 Original Reference No. 122:20631a,20634a **phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**. Shioi, Kousuke; Nakano, Hidefumi (Showa Denko K. K., Japan). Ger. Offen. DE 4423987 A1 **19950112**, 7 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1994-4423987 19940707. PRIORITY: JP 1993-170537 19930709; JP 1994-19508 19940216.
AB The process comprises subjecting **hexagonal BN** (**hBN**) to hot pressing at a temp. and pressure in the range where **cubic BN** (**cBN**) is stable, and in the presence of ≥1 compds. selected from the amide and imide of Group IA and IIA elements. Residual **hexagonal BN** is removed with NaOH. A mixt. of **hBN** and Li amide in Li/B at. ratio 20:100 was compression-molded and the material was heat-treated at 4.5 GPa and 1400° for 10 min to give **cBN** at a conversion rate of 84%.
IT **10043-11-5P**, Boron nitride (BN), preparation
(**phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IT **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium, uses **7782-89-0**, Lithium amide
(**phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)
RN 7439-93-2 HCA
CN Lithium (CA INDEX NAME)

Li

RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

RN 7782-89-0 HCA
CN Lithium amide (Li(NH2)) (CA INDEX NAME)

$Li-NH_2$

IC ICM C01B021-064
ICS C30B029-38; C30B028-02
ICA C09K003-14
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 57
ST **boron nitride hexagonal cubic phase** transfer; lithium amide **phase** transfer **catalyst**; Group IA IIA amide imide **catalyst**; magnesium **phase** transfer **catalyst**; calcium **phase** transfer **catalyst**; chromium **phase** transfer **catalyst**; manganese **phase** transfer **catalyst**; iron **phase** transfer **catalyst**; cobalt **phase** transfer **catalyst**; nickel **phase** transfer **catalyst**; zinc **phase** transfer **catalyst**; aluminum **phase** transfer **catalyst**; lanthanum **phase** transfer **catalyst**; cerium **phase** transfer **catalyst** ; praseodymium **phase** transfer **catalyst**; neodymium **phase** transfer **catalyst**; samarium **phase** transfer **catalyst**; gadolinium **phase** transfer **catalyst**
IT Alkali metals, uses
Alkaline earth metals
Group IIB elements

Group IIIA elements
Group IIIB elements
Group VIB elements
Group VIIB elements
Group VIII elements
(**phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

IT Alkali metal compounds
Alkaline earth compounds
(amides, **phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

IT Powder metallurgy
(hot-pressing, **phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

IT Alkali metal compounds
Alkaline earth compounds
(imides, **phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

IT **Catalysts** and **Catalysis**
(**phase**-transfer, **phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

IT 1310-73-2, Sodium hydroxide, uses
(leachant; **phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

IT **10043-11-5P**, Boron nitride (BN), preparation
(**phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses **7439-93-2**, Lithium, uses **7439-95-4**, Magnesium, uses 7439-96-5, Manganese, uses 7440-00-8, Neodymium, uses 7440-02-0, Nickel, uses 7440-10-0, Praseodymium, uses 7440-19-9, Samarium, uses 7440-42-8, Boron, uses 7440-45-1, Cerium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-54-2, Gadolinium, uses 7440-66-6, Zinc, uses 7440-70-2, Calcium, uses **7782-89-0**, Lithium amide
(**phase**-transfer process and **catalysts** for **cubic boron nitride** formation from **hexagonal boron nitride**)

RE

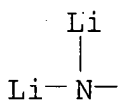
(1) Anon; DE 1220837 B
(2) Anon; DE 2829383 A1 HCA
(3) Anon; US 2947617 A HCA
(4) Anon; DD 89395 C

L66 ANSWER 11 OF 15 HCA COPYRIGHT 2009 ACS on STN
118:32031 Original Reference No. 118:5661a,5664a Effect of several additives in the synthesis of **cubic boron nitride** using alkali or alkaline earth nitrides.
Bocquillon, Genevieve; Loriers-Susse, Christiane; Loriers, Jean (Lab. Physicochim. Mater., Meudon, 92195, Fr.). Comptes Rendus de l'Academie des Sciences, Serie II: Mecanique, Physique, Chimie, Sciences de la Terre et de l'Univers, 315(9), 1069-72 (French) **1992**. CODEN: CRAMED. ISSN: 0764-4450.

AB Addn. in appropriate proportion of particular elements M' such as Al, B, Si, Ti to **hexagonal BN** and alk. or alk. earth nitrides MxNy, more precisely to Li3N, Ca3N2, Mg3N2, leads in fluxes at high pressure to **cubic BN** crystals with smoother faces, sharper edges and more compact shapes, these characteristics allowing one to foresee their higher strength. This addn. increases the crystal size which reaches 0.5 mm. This effect is interpreted as resulting from flux modifications, 1 of which is the apparition of excess B. One observes a correlation between the proportion of M' corresponding to the complete redn. of MxNy by M' and the min. proportion giving a majority of crystals showing the new morphol. The latter is accompanied by a color change from yellow-orange to brown-black.

IT **26134-62-3**, Lithium nitride **56127-34-5**, Magnesium nitride
(for prepn. of **cubic boron nitride** by high-pressure **phase transition** in fluxes)

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



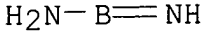
RN 56127-34-5 HCA
CN Magnesium nitride (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	x	17778-88-0
Mg	x	7439-95-4

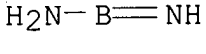
IT **10043-11-5P**, Boron nitride (BN), preparation
(prepn. of **cubic**, by high-pressure **phase transition** in fluxes contg. alkali metal or alk. earth nitrides and various elements)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

CC 78-5 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 57
ST **boron nitride cubic** prepn additive; crystal form improvement **cubic boron nitride**
IT Crystal morphology
(of boron nitride prepd. by high-pressure **phase transition** in fluxes contg. various elements and alkali metal or alk. earth nitrides)
IT 7429-90-5, Aluminum, uses 7440-21-3, Silicon, uses 7440-32-6, Titanium, uses 7440-42-8, Boron, uses 12013-82-0, Calcium nitride **26134-62-3**, Lithium nitride **56127-34-5**, Magnesium nitride
(for prepn. of **cubic boron nitride** by high-pressure **phase transition** in fluxes)
IT **10043-11-5P**, Boron nitride (BN), preparation
(prepn. of **cubic**, by high-pressure **phase transition** in fluxes contg. alkali metal or alk. earth nitrides and various elements)

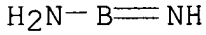
L66 ANSWER 12 OF 15 HCA COPYRIGHT 2009 ACS on STN
115:259338 Original Reference No. 115:44061a,44064a Preparation of mixtures for **cubic boron nitride** manufacture. Matus, Eduard (Czech.). Czech. CS 269746 B1 **19910206**, 4 pp. (Czech). CODEN: CZXXA9. APPLICATION: CS 1989-1845 19890324.
AB The process comprises hot pressing powd. mixts. consisting 10-90 wt.% **hexagonal BN** and balance **catalyst** at 600-1000° to obtain mixts. having d. >65% of theor. The **catalyst** is selected from Li3BN2, LiMgBN2, and LiCaBN2.
IT **12408-97-8**, Boron lithium nitride (BLi3N2)
87354-58-3 137635-80-4
(**catalyst**, **phase** transfer, mixts. contg. **hexagonal boron nitride** and, prepn. of powd., for **cubic boron nitride** manuf.)
RN 12408-97-8 HCA
CN Boranamine, 1-imino-, trilithium salt (9CI) (CA INDEX NAME)



RN 87354-58-3 HCA
CN Boranamine, 1-imino-, calcium lithium salt (1:1:1) (9CI) (CA INDEX NAME)



RN 137635-80-4 HCA
CN Boranamine, 1-imino-, lithium magnesium salt (1:1:1) (9CI) (CA INDEX NAME)



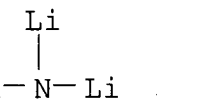
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, manuf. of, from **hexagonal boron nitride**, **phase** transfer **catalyst**-contg. mixt. prepn. for, by hot pressing)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IC ICM C01B021-064
CC 49-5 (Industrial Inorganic Chemicals)
ST **hexagonal boron nitride** hot pressing; **phase** transfer **catalyst** hot pressing; **cubic boron nitride** manuf **hexagonal**; lithium boron nitride **catalyst**; magnesium lithium boron nitride; calcium lithium boron nitride
IT Sintering
(hot pressing, densification by, of **hexagonal boron nitride-phase** transfer **catalyst** mixts., in **cubic boron nitride** manuf.)
IT **12408-97-8**, Boron lithium nitride (BLi3N2) **87354-58-3 137635-80-4**
(**catalyst**, **phase** transfer, mixts. contg. **hexagonal boron nitride** and, prepn. of powd., for **cubic boron nitride** manuf.)
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, manuf. of, from **hexagonal boron nitride**, **phase** transfer **catalyst**-contg. mixt. prepn. for, by hot pressing)

L66 ANSWER 13 OF 15 HCA COPYRIGHT 2009 ACS on STN
101:115742 Original Reference No. 101:17605a,17608a **Cubic boron nitrides**. (Showa Denko K. K., Japan). Jpn. Kokai Tokkyo Koho JP 59073411 A **19840425** Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1982-180007 19821015.
AB In the **catalytic** synthesis of **cubic BN** from **hexagonal BN**, the **catalyst** is prepd. from a (1-1.4):(1-1.4):3 mol ratio mixt. of Li3N, at least 2 nitrides of Be, Mg, Ca, Sr, and Ba, and BN by calcining in an inert atm. at 700-1200°. Thus, a mixt. contg. Li3N, Mg3N2, Sr3N2, and BN in 1:0.9:0.4:3 mol ratio was fired at 1000° for 1 h in N2, crushed to <150 mesh, mixed with **hexagonal BN** at a 1:5 wt. ratio, molded, and hot-pressed at 1450° and 53 kbar for 10 min to give **cubic BN** in 43% yield, compared to 28 when the **catalyst** mixt. was not fired.
IT **12057-71-5 26134-62-3**
(**catalysts**, for **hexagonal**-to-**cubic boron nitride phase transformation**, firing of, for increased **cubic phase** yield)
RN 12057-71-5 HCA

CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5**, properties
(**hexagonal**-to-**cubic phase transformation** of, nitride **catalysts** for, firing of, for increased **cubic phase** yield)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

IC C01B021-064; B01J027-24
CC 57-2 (Ceramics)
ST **cubic boron nitride** prepn
IT **Catalysts** and **Catalysis**
(nitride, for **hexagonal**-to-**cubic boron nitride** transformation, firing of, for increased **cubic phase** yield)
IT 12033-82-8 **12057-71-5 26134-62-3**
(**catalysts**, for **hexagonal**-to-**cubic boron nitride phase transformation**, firing of, for increased **cubic phase** yield)
IT **10043-11-5**, properties
(**hexagonal**-to-**cubic phase transformation** of, nitride **catalysts** for, firing of, for increased **cubic phase** yield)

L66 ANSWER 14 OF 15 HCA COPYRIGHT 2009 ACS on STN
101:115737 Original Reference No. 101:17601a,17604a **Cubic boron nitride**. (Showa Denko K. K., Japan). Jpn. Kokai Tokkyo Koho JP 59057905 A **19840403** Showa, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1982-168269 19820929.
AB A (1-1.4):(1-1.4):3 mixt. of Li3N, Mg3N2, Sr3N2, or Be3N2, and BN is heated at 800-1300° in an inert gas atm., powd., and used at **catalyst**. A compacted mixt. of the **catalyst** and **hexagonal BN** (**h-BN**) has higher strength than a conventional mixt. of **h-BN** and Li3BN2 or Ca3B2N4 so that the heating period at a high temp. and

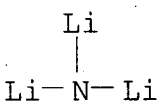
pressure is shorter with higher yield of **cubic BN** . Thus, a 1:1:3 mixt. of Li3N, Mg3N2, and BN -150 mesh each was heated in a Pt crucible in a N2 stream 8 L/min at 900° for 1 h, powd. to <150 mesh in N2, mixed with h-8N in a 1:3 ratio, compacted to 20 diam. + 20 mm, and heated at 60 kbar and 1500° for 10 min. The strength (X 108 kg/m2) was 4.25 and **cubic BN** yield 38%, compared to 3.50 and 18, resp., when a 1.1:1.2:3 mixt. was compacted and heated directly, or 3.64 and 26, resp. when a 1:3 mixt. of Li3BN2 and **h-BN** was compacted and heated at 56 kbar and 1450° for 20 min.

IT **12057-71-5 26134-62-3**
(**catalyst** contg., for **hexagonal**-to-**cubic boron nitride** transformation, filing of, for increased yield of **cubic phase**)

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)

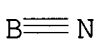
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5**, properties
(**hexagonal**-to-**cubic phase transformation** of, nitride **catalysts** for, filing of, for increased **cubic phase** yield)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)



IC C01B021-064; B01J027-24
CC 57-2 (Ceramics)
ST **cubic boron nitride** prepn
IT **Catalysts** and **Catalysis**
(nitride, for **boron nitride hexagonal -to-cubic phase transformation**, filing of, for increased **cubic phase** yield)

IT 1304-54-7 12033-82-8 **12057-71-5 26134-62-3**
(**catalyst** contg., for **hexagonal**-to-**cubic boron nitride** transformation, filing of, for increased yield of **cubic phase**

)

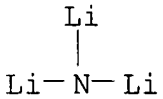
IT **10043-11-5**, properties
(**hexagonal**-to-**cubic phase transformation** of, nitride **catalysts** for, filing of, for increased **cubic phase** yield)

L66 ANSWER 15 OF 15 HCA COPYRIGHT 2009 ACS on STN
92:224514 Original Reference No. 92:36203a,36206a Formation of **cubic boron nitride** by using calcium oxide and lithium nitride as **catalysts**. Hasegawa, Kanemitsu; Sekiya, Tadashi; Nakayama, Noboru (Gov. Ind. Res. Inst., Nagoya, Nagoya, Japan). Nagoya Kogyo Gijutsu Shikensho Hokoku, 28(12), 388-93 (Japanese) **1979**. CODEN: NKGSAR. ISSN: 0027-7614.

AB The effect of CaO and Li3N as **catalyst** on the transition of **hexagonal BN** into **cubic BN** was investigated. One part (by wt.) of CaO or Li3N was mixed with 4 or 3 parts of **hexagonal BN**, and each mixt. was kept for 15-20 min at 800-1600° and 5-7 GPa. X-ray diffraction anal. showed for CaO that those species assocd. with processed samples are **cubic BN**, **hexagonal BN**, Ca3B2O6, and CaO and that the higher the pressure or temp., the more rapidly **cubic BN** is produced. CaO may be regarded as a good **catalyst**; the temp.-pressure condition may be made milder if the crystallinity of **hexagonal BN** has been increased by heating it in vacuo for 3 h at 600°. Li3N is far superior to CaO in **catalytic** activity, which is almost independent of the crystallinity of **hexagonal BN**.

IT **26134-62-3**
(**catalysis** by, of **boron nitride hexagonal-cubic phase transition**)

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5**, properties
(**phase transitions** of, effect of calcium oxide and lithium nitride on **hexagonal-cubic**)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

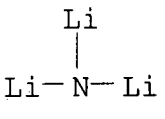
CC 75-3 (Crystallization and Crystal Structure)
Section cross-reference(s): 67
ST **boron nitride cubic** formation **catalyst; phase transition** boron nitride **catalyst;** calcium oxide transition boron nitride; lithium nitride boron **phase transition**
IT **Catalysts** and **Catalysis**
(calcium oxide and lithium nitride, for **boron nitride hexagonal-cubic phase transition**)
IT 1305-78-8, uses and miscellaneous **26134-62-3**
(**catalysis** by, of **boron nitride hexagonal-cubic phase transition**)
IT **10043-11-5**, properties
(**phase transitions** of, effect of calcium oxide and lithium nitride on **hexagonal-cubic**)

=> D L67 1-30 CBIB ABS HITSTR HITIND RE

L67 ANSWER 1 OF 30 HCA COPYRIGHT 2009 ACS on STN
142:413422 High temperature and high pressure method for synthesizing B-C-N **cubic** crystal in the presence of **catalyst.**
Tian, Yongjun (Yanshan University, Peop. Rep. China). Faming Zhuanli Shenqing Gongkai Shuomingshu CN 1451472 A **20031029**, 5 pp. (Chinese). CODEN: CNXXEV. APPLICATION: CN 2003-128765 20030509.
AB The method comprises mixing B with graphite and **hexagonal BN** based on BxCy(BN)z, mech. alloying in vacuum or in protective gas ambient for 50-200 h to obtain precursor; press forming with **catalyst** powder (Ca3B2N4, Mg3B2N4, **Li3N**, Ca3N2, or **Mg3N2**), assembling with graphite (Ta, NaCl, or ZrO2)-lined tubular, pyrophyllite tubular, or graphite tubular heater, synthesizing at ≥1100° and ≥5 GPa for 2-30 min, and treating in H2SO4-HNO3 to dissolve and remove **catalyst.** The BC2N and B2CN **hexagonal** crystals are synthesized by the method.
IT **10043-11-5**, Boron nitride, uses **12057-71-5**, Magnesium nitride **26134-62-3**, Lithium nitride
(high temp. and high pressure method for synthesizing B-C-N **cubic** crystal in presence of **catalyst**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



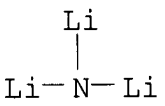
IC ICM B01J003-06
CC 47-4 (Apparatus and Plant Equipment)
Section cross-reference(s): 67
ST boron carbon nitride **hexagonal** crystal synthesis
IT **Catalysts**
(high temp. and high pressure method for synthesizing B-C-N **cubic** crystal in presence of **catalyst**)
IT 120039-00-1P, Boron carbide nitride (BC2N) 730241-98-2P, Boron carbide nitride (B2CN)
(high temp. and high pressure method for synthesizing B-C-N **cubic** crystal in presence of **catalyst**)
IT 1314-23-4, Zirconia, uses 7440-25-7, Tantalum, uses 7440-42-8, Boron, uses 7647-14-5, Sodium chloride, uses 7782-42-5, Graphite, uses **10043-11-5**, Boron nitride, uses 12013-82-0, Calcium nitride **12057-71-5**, Magnesium nitride **26134-62-3**, Lithium nitride 65453-51-2 71330-55-7
(high temp. and high pressure method for synthesizing B-C-N **cubic** crystal in presence of **catalyst**)

L67 ANSWER 2 OF 30 HCA COPYRIGHT 2009 ACS on STN
139:106982 Study on the **catalytic** function of **Li3N**, **Mg3N2**, Ca3N2. Xu, Xiao-Wei; Li, Yu-Ping; Zhao, Hong-Mei; Fan, Hui-Li; Zhang, Yong-Jie (Material Science and Engineering School, University of Science and Technology Beijing, Beijing, 100083, Peop. Rep. China). Gaoya Wuli Xuebao, 17(2), 141-144 (Chinese) **2003**. CODEN: GWXUER. ISSN: 1000-5773. Publisher: Gaoya Wuli Xuebao Bianjibu.
AB T is well known that **Li3N**, **Mg3N2** and Ca3N2 are **catalysts** for **cBN** synthesis under high temp. and high pressure. We discovered that they could also act as **catalysts** for **hBN** formation at high temp. and normal pressure. It is confirmed that, from a series comparative expts., each of them has **catalysts** effect only on melting

condition, the **catalytic** order for **hBN** formation is **Li3N** > **Mg3N2** > Ca3N2, which is similar to that for **cBN** synthesis. The suggestion that a **catalyst** for **hBN** formation may also be a **catalyst** for **cBN** synthesis may be reliable.

IT **12057-71-5**, Magnesium nitride(**mg3n2**)
26134-62-3, Lithium nitride(**li3n**)
(**catalytic** function of **Li3N**, **Mg3N2**, Ca3N2)

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic** and **hexagonal**; **catalytic** function of **Li3N**, **Mg3N2**, Ca3N2)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
ST lithium nitride **catalyst** synthesis **cubic** **hexagonal boron nitride**; magnesium nitride **catalyst** synthesis **cubic** **hexagonal boron nitride**; calcium nitride **catalyst** synthesis **cubic hexagonal** **boron nitride**
IT **Catalysts**
(**catalytic** function of **Li3N**, **Mg3N2**, Ca3N2)
IT Nitrides
(**catalytic** function of **Li3N**, **Mg3N2**, Ca3N2)
IT 12013-82-0, Calcium nitride(ca3n2) **12057-71-5**, Magnesium nitride(**mg3n2**) **26134-62-3**, Lithium nitride(**li3n**)
(**catalytic** function of **Li3N**, **Mg3N2**, Ca3N2)

IT **10043-11-5P, Boron nitride**, preparation
(**cubic** and **hexagonal; catalytic**
function of **Li3N, Mg3N2**, Ca3N2)

L67 ANSWER 3 OF 30 HCA COPYRIGHT 2009 ACS on STN
131:93072 Investigation of the chemical reactivity and stability of c-BNP. Sachdev, H.; Strauss, M. (Institute for Inorganic Chemistry FR 11.1, University of Saarland, Saarbruecken, 66041, Germany). Diamond and Related Materials, 8(2-5), 319-324 (English) **1999**. CODEN: DRMTE3. ISSN: 0925-9635. Publisher: Elsevier Science S.A..

AB Bulk material of **cubic boron nitride** (**c-BN**) is com. achieved via high pressure-high temp. (HPHT) synthesis from **h-BN** with various **catalysts** (flux precursors). Since recent investigations indicated **c-BN** to be the stable modification at std. conditions there is considerable interest to realize a **c-BN** synthesis at normal or low pressure. Thus growth conditions allowing high mobility for boron and nitrogen atoms have to be found. The interaction of **c-BN** with various flux precursors used under HPHT conditions was investigated up to 1300 °C at ambient pressure. The reagents were chosen with regard to their ability to stabilize intermediate reaction products. Metals, nitrides and fluorides were applied for the chem. attack. The morphol. changes and degrdn. of the **c-BN** crystals were examd. by SEM, X-ray diffraction and IR spectroscopy. SEM studies indicate that the degrdn. of **c-BN** depends strongly on the nature of the flux precursors. Those leading to an intermediate **phase** during the reaction exhibit distinct etching figures on (111)-planes of **c-BN**, while reagents leading to the formation of several products cause an inhomogeneous decay. Since the degrdn. of **c-BN** resembles the reversed growth, the reaction mechanism of the interaction of **c-BN** with reactive melts allows to establish a growth and degrdn. model of the cubic **phase**. The results shall help finding new routes to grow **c-BN** in a low pressure-melt or chem. vapor deposition process.

IT **12057-71-5**, Magnesium nitride(**mg3n2**)
(investigation of chem. reactivity and stability of c-BNP)

RN 12057-71-5 HCA

CN Magnesium nitride (Mg3N2) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 67-3 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

ST chem reactivity stability **cubic boron nitride**

IT 7429-90-5, Aluminum, reactions 7439-95-4, Magnesium, reactions

7440-43-9, Cadmium, reactions 7440-66-6, Zinc, reactions 7440-70-2, Calcium, reactions 7637-07-2, Boron trifluoride, reactions 7681-49-4, Sodium fluoride, reactions 7783-40-6, Magnesium fluoride(mgf2) 7783-49-5, Zinc difluoride 10043-11-5, Boron nitride, reactions **12057-71-5**, Magnesium nitride(**mg3n2**)
(investigation of chem. reactivity and stability of c-BNP)

RE
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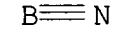
L67 ANSWER 4 OF 30 HCA COPYRIGHT 2009 ACS on STN
127:286129 Original Reference No. 127:55731a,55734a Kinetic and thermodynamic investigation of **cBN** formation in the system BN-**Mg3N2**. Lorenz, H.; Peun, T.; Orgzall, I. (Fachbereich Physikalische Technik, Markische Fachhochschule, Iserlohn, D-58644, Germany). Applied Physics A: Materials Science & Processing, 65(4/5), 487-495 (English) **1997**. CODEN: APAMFC. ISSN: 0947-8396. Publisher: Springer.

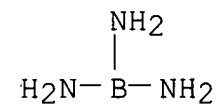
AB Exptl. high pressure-high temp. results on **cBN** formation in the **Mg3N2**-BN system are presented and discussed. In particular, a temp. region slightly above the lower limit of the formation region characterized by fast transformation processes and submicron **cBN** grains strongly agglomerated was investigated in more detail concerning thermodn. and kinetics. The **catalyst**/solvent active in that temp. interval is Mg3BN3

previously formed at ≈5.5 GPa and 1170 K in a solid-state reaction. The **cBN** formation proceeds as pptn. from a eutectic melt formed by the intermediate compd. and BN. These results are used to improve the previously proposed **phase** diagram for the **Mg3N2**-BN system. The kinetics is discussed based on the usual Avrami theory. It follows that the processes may be described by nearly instantaneous nucleation at the beginning of the reaction with large rate. Growth processes are soon inhibited due to strong impingement of the formed nuclei and grains so that an Avrami exponent n in the neighborhood of 1 results. This exponent, as well as the rate const. k summarizing the phys. mechanisms of nucleation and growth, show a temp. dependence.

IT **10043-11-5, Boron nitride,** properties
(**cubic;** kinetics of **c-BN** formation due to structural transition in the system **h-BN /Mg3N2**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)



IT **121768-76-1,** Boron magnesium nitride (BMg3N3)
(formation during **c-BN** formation due to structural transition in the system **h-BN/ Mg3N2**)
RN 121768-76-1 HCA
CN Boranetriamine, magnesium salt (1:3) (9CI) (CA INDEX NAME)



IT **12057-71-5,** Magnesium nitride
(kinetics of **c-BN** formation due to structural transition in the system **h-BN/Mg3N2**)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
CC 75-7 (Crystallography and Liquid Crystals)
ST **cubic boron nitride** structural

transition kinetics
IT Physical process kinetics
Structural **phase transition**
(kinetics of **c-BN** formation due to structural transition in the system **h-BN/Mg3N2**
)
IT **10043-11-5, Boron nitride**, properties
(**cubic**; kinetics of **c-BN** formation due to structural transition in the system **h-BN/Mg3N2**)
IT **121768-76-1**, Boron magnesium nitride (BMg3N3)
(formation during **c-BN** formation due to structural transition in the system **h-BN/Mg3N2**)
IT **12057-71-5**, Magnesium nitride
(kinetics of **c-BN** formation due to structural transition in the system **h-BN/Mg3N2**
)

L67 ANSWER 5 OF 30 HCA COPYRIGHT 2009 ACS on STN
126:333418 Original Reference No. 126:64737a,64740a Magnesium boron nitride used in synthesis of **CBN**. Zhang, Xiangfa; Zhou, Wanli; Li, Zhenhe; Li, Gang (Zhengzhou Inst. Abrasives and Grinding, Ministry of Mechanical Eng., 450007, Peop. Rep. China). Moliao Moju Yu Moxue (1), 2-4, 10 (Chinese) **1995**. CODEN: MMYMF5. ISSN: 1001-442X. Publisher: Moliao Moju Yu Moxue Bianjibu.
AB On the base of prepg. and analyzing the ambient atm. **phase** of magnesium boron nitride, the transition of magnesium boron nitride from ambient atm. **phase** to high-pressure **phase** are investigated over the pressure and temp. ranges 2.5-5.1 GPa and 400-1600°C, resp. The nucleation characteristics of **cubic BN** (**CBN**) crystals are studied using **hexagonal BN** as starting material and magnesium boron nitride as **catalyst**.
IT **71330-55-7P**, Boron magnesium nitride b2mg3n4
(**catalyst**; prepn. and high-pressure **phase transition** of magnesium boron nitride and its use as a **catalyst** in the synthesis of **cubic BN**
)
RN 71330-55-7 HCA
CN Boranamine, 1-imino-, magnesium salt (2:3) (9CI) (CA INDEX NAME)

IT **10043-11-5P, Boron nitride (BN)**, preparation
(**cubic**; prepn. and high-pressure **phase transition** of magnesium boron nitride and its use as a **catalyst** in the synthesis of **cubic BN**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-7 (Ceramics)
Section cross-reference(s): 49
ST magnesium boron nitride **catalyst** prepn property; **cubic boron nitride** prepn nitride **catalyst**
IT Crystal nucleation
(**cubic boron nitride**; prepn. and high-pressure **phase transition** of magnesium boron nitride and its use as a **catalyst** in the synthesis of **cubic BN**)
IT **Catalysts**
(magnesium boron nitride; prepn. and high-pressure **phase transition** of magnesium boron nitride and its use as a **catalyst** in the synthesis of **cubic BN**)
IT **71330-55-7P**, Boron magnesium nitride b2mg3n4
(**catalyst**; prepn. and high-pressure **phase transition** of magnesium boron nitride and its use as a **catalyst** in the synthesis of **cubic BN**)
IT **10043-11-5P, Boron nitride (BN)**, preparation
(**cubic**; prepn. and high-pressure **phase transition** of magnesium boron nitride and its use as a **catalyst** in the synthesis of **cubic BN**)

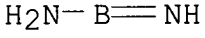
L67 ANSWER 6 OF 30 HCA COPYRIGHT 2009 ACS on STN
123:128037 Original Reference No. 123:22499a,22502a High pressure **phase transformations** of **cubic** boron nitride from amorphous boron nitride using magnesium boron nitride as the **catalyst**. Singh, B. P.; Nover, G.; Will, G. (National Physical Laboratory, New, DELHI-110012, India). Journal of Crystal Growth, 152(3), 143-9 (English) **1995**. CODEN: JCRGAE. ISSN: 0022-0248. Publisher: Elsevier.

AB Results are described of high pressure **phase transformations** of amorphous B nitride (aBN) to **cubic** B nitride (cBN) using Mg B nitride (Mg3B2N4) as a **catalyst**-solvent. Amorphous B nitride undergoes various structural modifications under high pressures and high temps. giving **hexagonal, cubic** and wurtzitic **phases** of B nitride. The min. pressure at which aBN starts transforming into cBN is 25 kbar at 1800°. This is the lowest pressure for cBN formation employing the **catalyst**-solvent process and is reported here for the 1st time.

IT **71330-55-7,** Magnesium boride nitride (Mg3B2N4)
(**catalyst** in **phase transitions.** of amorphous boron nitride)

RN 71330-55-7 HCA

CN Boranamine, 1-imino-, magnesium salt (2:3) (9CI) (CA INDEX NAME)



●3/2 Mg

IT **10043-11-5,** Boron nitride, processes
(high pressure **phase transitions** of amorphous boron nitride using magnesium boron nitride as **catalyst**.)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 67

ST boron nitride amorphous **phase transition catalyst;** crystn amorphous boron nitride **catalyst**

IT **Catalysts** and **Catalysis**
(magnesium boride nitride in **phase transitions** of amorphous boron nitride)

IT **71330-55-7,** Magnesium boride nitride (Mg3B2N4)
(**catalyst** in **phase transitions.** of amorphous boron nitride)

IT **10043-11-5,** Boron nitride, processes
(high pressure **phase transitions** of amorphous boron nitride using magnesium boron nitride as **catalyst**)

L67 ANSWER 7 OF 30 HCA COPYRIGHT 2009 ACS on STN
123:39192 Original Reference No. 123:7029a,7032a Rapid formation of **cubic boron nitride** in the system **Mg3N2-hBN**. Lorenz, H.; Orgzall, I.; Hinze, E. (Maerkische Fachhochschule, FB Physikalische Technik Frauenstuhlweg 31, D-58644, Iserlohn, Germany). Diamond and Related Materials, 4(8), 1050-5 (English) **1995**. CODEN: DRMTE3. ISSN: 0925-9635. Publisher: Elsevier.

AB The **catalytic** transformation from **hexagonal** (**h**)-**BN** to **cubic** (**c**)-**BN** in the system **Mg3N2-hBN** was investigated under high pressures and temp. using in-situ sensing methods. At the threshold of the **cBN** formation region (approx. 1550 K at 5.5 GPa), very fast formation processes leading to submicron **cBN** grains are obsd. in a small temp. interval (140 K at 5.5 GPa). The transformation proceeds in a eutectic melt. Model assumptions of dissoln. and pptn. could be confirmed. The only intermediate **phase** formed under these thermodn. conditions is Mg3BN3 thus forming the solvent for this process.

IT **12057-71-5**, Magnesium nitride **Mg3N2**
(**catalyst**/solvent; rapid formation of **cubic boron nitride** in the system **Mg3N2**-**hexagonal BN** by **catalytic** transformation)

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **10043-11-5**, **Boron nitride**, processes
(**cubic**; rapid formation of **cubic boron nitride** in the system **Mg3N2**-**hexagonal BN** by **catalytic** transformation)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-2 (Ceramics)
ST **boron nitride cubic phase** formation; magnesium nitride system **cubic boron nitride**

IT **12057-71-5**, Magnesium nitride **Mg3N2**
(**catalyst**/solvent; rapid formation of **cubic boron nitride** in the system **Mg3N2**-**hexagonal BN** by **catalytic** transformation)

IT **10043-11-5**, **Boron nitride**, processes

(**cubic**; rapid formation of **cubic boron nitride** in the system **Mg3N2**-**hexagonal BN** by **catalytic** transformation)

L67 ANSWER 8 OF 30 HCA COPYRIGHT 2009 ACS on STN
122:15375 Original Reference No. 122:3101a,3104a High pressure **phase transformations** in turbostratic boron nitride using magnesium boron nitride as the **catalyst**.
Bindal, M. M.; Singh, B. P.; Singhal, S. K.; Nayar, R. K.; Chopra, Rajeev (High Pressure Technology Division, National Physical Laboratory, Dr. K.S. Krishnan Road, New, DELHI-110012, India).
Journal of Crystal Growth, 144(1/2), 97-102 (English) **1994**
. CODEN: JCRGAE. ISSN: 0022-0248. Publisher: Elsevier.

AB Results of high pressure **phase transformations** in turbostratic boron nitride (tBN) using magnesium boron nitride as the **catalyst**-solvent are described. It was obsd. that turbostratic boron nitride undergoes various structural changes accompanied with the formation of **hexagonal, cubic** and wurtzitic modifications of boron nitride at high pressures and high temps. It was also found that the formation of these **phases** is sensitive to the pressures and temps. prevailing in the reaction zone. At higher pressure (>40 kbar) and temps. (>1300°C), **cubic** boron nitride (CBN) was obsd. as the predominant **phase**, whereas at lower pressure (≤40 kbar) and 1300°C, the predominant **phase** was that of wurtzitic boron nitride (WBN). The tBN - WBN **phase transformation** under static high P-T conditions with the use of **catalyst**-solvent process is reported for the first time.

IT **123213-37-6**, Magnesium boride nitride
(**catalyst**; high-pressure **phase transformations** in turbostratic boron nitride using magnesium boron nitride as **catalyst**)

RN 123213-37-6 HCA
CN Magnesium boride nitride (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	x	17778-88-0
B	x	7440-42-8
Mg	x	7439-95-4

IT **10043-11-5**, Boron nitride, processes
(turbostratic; high-pressure **phase transformations** in turbostratic boron nitride using magnesium boron nitride as **catalyst**)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

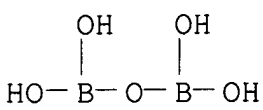
B≡N

CC 57-2 (Ceramics)
ST **phase transformation** turbostratic boron nitride pressure
IT **Phase transition**
(high-pressure **phase transformations** in turbostratic boron nitride using magnesium boron nitride as **catalyst**)
IT **123213-37-6**, Magnesium boride nitride
(**catalyst**; high-pressure **phase transformations** in turbostratic boron nitride using magnesium boron nitride as **catalyst**)
IT **10043-11-5**, Boron nitride, processes
(turbostratic; high-pressure **phase transformations** in turbostratic boron nitride using magnesium boron nitride as **catalyst**)

L67 ANSWER 9 OF 30 HCA COPYRIGHT 2009 ACS on STN
121:115756 Original Reference No. 121:20789a,20792a Effect of magnesia on the formation of **cubic boron nitride**
. Xu, Xiaowei; Li, Yuping; Ma, Wenjun; Guo, Weili (Department Physical Chemistry, University Science Technology, Beijing, 100083, Peop. Rep. China). Rengong Jingti Xuebao, 23(2), 165-8 (English) **1994**. CODEN: RJXUEN. ISSN: 1000-9868.
AB The effect of MgO on the synthesis of **cubic BN** (**cBN**) using Mg, **Mg3N2**, Mg3B2N4 as **catalysts**, was investigated by comparing the exptl. results of adding MgO to that of not adding MgO to the starting material. The results show that in some cases the synthesis of **cBN** is adversely affected, e.g., MgO formation in the growth front of **cBN** crystals hinders the diffusion of BN to the **cBN** crystal surfaces, and the MgO contained in the **cBN** crystals affects their transparency. However, the reaction of MgO with harmful B2O3 impurities are favorable for the synthesis of **cBN**.
IT **1309-48-4**, Magnesia, properties
(effect of, on **phase transition** in **cubic boron nitride** manuf.)
RN 1309-48-4 HCA
CN Magnesium oxide (MgO) (CA INDEX NAME)

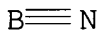
Mg=O

IT **13703-83-8P**, Magnesium borate (Mg2B2O5)
(formation of, in **cubic boron nitride** manuf., by reaction of magnesia with boron oxide impurities)
RN 13703-83-8 HCA
CN Diboric acid, magnesium salt (1:2) (CA INDEX NAME)



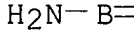
●2 Mg

IT **10043-11-5P**, Boron nitride, preparation
(**phase transition** of, **hexagonal-cubic**, **catalyst** for, effect of magnesia on)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)



IT **7439-95-4**, Magnesium, uses **12057-71-5**, Magnesium nitride **71330-55-7**, Boron magnesium nitride (B2Mg3N4)
(**phase**-transfer **catalyst**, effect of magnesia on, in **cubic boron nitride** manuf.)
RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 71330-55-7 HCA
CN Boranamine, 1-imino-, magnesium salt (2:3) (9CI) (CA INDEX NAME)

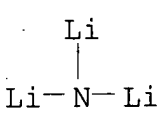


●3/2 Mg

CC 57-2 (Ceramics)
ST magnesia **cubic boron nitride catalyst**; magnesium boronitride **catalyst**
IT Impurities and Impurity centers
(boron oxide, reaction of, with magnesia, for magnesium borate, in **cubic boron nitride** manuf.)
IT **Catalysts** and **Catalysis**
(**phase**-transfer, magnesium and magnesium nitride and magnesium boronitride, effect of magnesia on, in **cubic boron nitride** manuf.)
IT **1309-48-4**, Magnesia, properties
(effect of, on **phase transition** in **cubic boron nitride** manuf.)
IT **13703-83-8P**, Magnesium borate (Mg2B2O5)
(formation of, in **cubic boron nitride** manuf., by reaction of magnesia with boron oxide impurities)
IT 1303-86-2, Boron oxide, reactions
(impurities, reaction of, with magnesia, for magnesium borate, in **cubic boron nitride** manuf.)
IT **10043-11-5P**, Boron nitride, preparation
(**phase transition** of, **hexagonal-cubic**, **catalyst** for, effect of magnesia on)
IT **7439-95-4**, Magnesium, uses **12057-71-5**, Magnesium nitride **71330-55-7**, Boron magnesium nitride (B2Mg3N4)
(**phase**-transfer **catalyst**, effect of magnesia on, in **cubic boron nitride** manuf.)

L67 ANSWER 10 OF 30 HCA COPYRIGHT 2009 ACS on STN
120:285863 Original Reference No. 120:50177a,50180a Method for preparing single crystals of **cubic boron nitride**. Bocquillon, Genevieve; Bogicevic, Christine; Loriers Susse, Christiane; Loriers, Jean (Centre National de la Recherche Scientifique, Fr.). Fr. Demande FR 2686101 A1 **19930716**, 10 pp. (French). CODEN: FRXXBL. APPLICATION: FR 1992-306 19920114.
AB In the method, involving conversion of **hexagonal BN** in the presence of a **catalyst** contg. at least an alkali metal or alk. earth nitride in a high-pressure high-temp. app., an element (Al, B, Si, Zr, or Ti) is added to the **catalyst**.
IT **12057-71-5**, Magnesium nitride **26134-62-3**, Lithium nitride
(**catalyst**, in prepg. single crystals of **cubic boron nitride**)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 26134-62-3 HCA

CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5P, Boron nitride,** preparation
(**cubic,** prepn. of single crystals of)
RN 10043-11-5 HCA.
CN Boron nitride (BN) (CA INDEX NAME)

IC ICM C30B029-38
ICS C30B009-00; C01B021-064; B01J003-06
CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 49
ST **cubic boron nitride** single crystal prepn
IT 7429-90-5, Aluminum, uses 7440-21-3, Silicon, uses 7440-32-6, Titanium, uses 7440-42-8, Boron, uses 7440-67-7, Zirconium, uses
(**catalyst** additive, in prepg. single crystals of **cubic boron nitride**)
IT 12013-82-0, Calcium nitride **12057-71-5,** Magnesium nitride **26134-62-3,** Lithium nitride
(**catalyst,** in prepg. single crystals of **cubic boron nitride**)
IT **10043-11-5P, Boron nitride,** preparation
(**cubic,** prepn. of single crystals of)
RE
(1) Anon; US 4287164 A HCA
(2) Anon; US 4980730 A HCA

L67 ANSWER 11 OF 30 HCA COPYRIGHT 2009 ACS on STN
120:60846 Original Reference No. 120:10921a,10924a Molded materials for manufacture of **cubic boron nitride** sintered products. Shindo, Toshihiko; Murayama, Toshuki; Sato, Yutaka; Kashida, Shu (Shinetsu Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 05246765 A **19930924** Heisei, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1992-80403 19920302.
AB The materials are **hexagonal BN** of gas transmission 0.01-0.3 cm2/s that are impregnated with **catalysts** which convert **hexagonal BN** to **cubic BN.** The materials are useful for the manuf. of high-purity **cubic BN** at high yield.

IT **12057-71-5**, Magnesium nitride (**mg3n2**)
(**catalyst**, for conversion of **hexagonal boron nitride** to **cubic boron nitride** during sintering)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, prepn. of, by conversion from **hexagonal phase**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IC ICM C04B035-58
ICS B01J003-06; B01J027-24; B01J035-10; B01J037-02; B28B003-00; C01B021-064
CC 57-2 (Ceramics)
ST **cubic boron nitride** ceramic; **hexagonal boron nitride** conversion ceramic
IT Ceramic materials and wares
(**boron nitride**, **cubic**, prepn. of)
IT **Catalysts** and **Catalysis**
(for conversion of **hexagonal boron nitride** to **cubic phase**)
IT **12057-71-5**, Magnesium nitride (**mg3n2**)
(**catalyst**, for conversion of **hexagonal boron nitride** to **cubic boron nitride** during sintering)
IT 71330-55-7
(ceramics, prepn. of for manuf. of high-purity **cubic boron nitride** products)
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, prepn. of, by conversion from **hexagonal phase**)

L67 ANSWER 12 OF 30 HCA COPYRIGHT 2009 ACS on STN
118:257597 Original Reference No. 118:44734h,44735a New concept of the synthesis of **cubic boron nitride**.
Nakano, Satoshi; Fukunaga, Osamu (Dep. Inorg. Mater., Tokyo Inst. Technol., Tokyo, 152, Japan). Metals, Materials and Processes, 3(4), 269-72 (English) **1992**. CODEN: MEMPEX. ISSN: 0970-423X.
AB Equil. **phase** boundary between **hBN** and **cBN** was detd. by the reactions from **cBN** to

hBN and from **hBN** to **cBN**. The boundary curve is expressed as P=T/200 - 3.5 (GPa. °C). Formation region of **cBN** in the BN-**catalyst** system showed distinct threshold pressure at about 5 GPa. The threshold pressure was found to decrease to about 3.8 GPa by the use of decompn. reaction of Mg3BN3.

IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**cubic boron nitride** synthesis by decompn. of)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, synthesis of, **phase** boundary equil. between modifications in relation to)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 57
ST **cubic boron nitride** synthesis
IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**cubic boron nitride** synthesis by decompn. of)
IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, synthesis of, **phase** boundary equil. between modifications in relation to)

L67 ANSWER 13 OF 30 HCA COPYRIGHT 2009 ACS on STN
115:186341 Original Reference No. 115:31801a,31804a Manufacture of finely divided **cubic boron nitride** from **hexagonal boron nitride** in the presence of **phase-transformation catalysts**. Lorenz, Helmar; Kuehne, Ulrich; Flegel, Karin; Hohlfeld, Christian; Lorenz, Bernd; Thaenert, Christian; Stromeyer, Regina (Akademie der Wissenschaften der DDR, Germany). Ger. (East) DD 291533 A5 **19910704**, 5 pp. (German). CODEN: GEXXA8. APPLICATION: DD 1990-337025 19900110.

AB Using alk. earth metals or alk. earth nitrides or boronitrides, or their mixts., the **phase** transfer is carried out at 5.5-7.0 GPa, 1250-1450°, for 10-90 s. The resulting **cubic BN** is suitable for use in the manuf. of abrasives.

IT **7439-95-4**, Magnesium, uses and miscellaneous
12057-71-5, Magnesium nitride (**Mg3N2**)
123213-37-6, Magnesium boride nitride

(**catalyst**, in **cubic boron nitride** powder manuf. from **hexagonal boron nitride**)
RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 123213-37-6 HCA
CN Magnesium boride nitride (CA INDEX NAME)

Component	Ratio	Component Registry Number
N	x	17778-88-0
B	x	7440-42-8
Mg	x	7439-95-4

IC ICM C01B021-064
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 57
ST **boron nitride hexagonal cubic** manuf
IT Alkaline earth metals
(alk. earth metals and nitrides and boronitrides, in **cubic boron nitride** powder manuf. from **hexagonal boron nitride**)
IT Alkaline earth compounds
(boride nitrides, alk. earth metals and nitrides and boronitrides, in **cubic boron nitride** powder manuf. from **hexagonal boron nitride**)
IT Alkaline earth pnictides
(nitrides, alk. earth metals and nitrides and boronitrides, in **cubic boron nitride** powder manuf. from **hexagonal boron nitride**)
IT **7439-95-4**, Magnesium, uses and miscellaneous 7440-70-2, Calcium, uses and miscellaneous 12013-82-0, Calcium nitride **12057-71-5**, Magnesium nitride (**Mg3N2**) 65453-51-2, Calcium boronitride (Ca3B2N4) **123213-37-6**, Magnesium boride nitride
(**catalyst**, in **cubic boron nitride** powder manuf. from **hexagonal boron nitride**)

L67 ANSWER 14 OF 30 HCA COPYRIGHT 2009 ACS on STN
115:82539 Original Reference No. 115:14038h,14039a Synthesis of **cubic boron nitride** using magnesium as the **catalyst**. Bindal, M. M.; Singhal, S. K.; Singh, B. P.; Nayar, R. K.; Chopra, R.; Dhar, A. (Natl. Phys. Lab., New Delhi, 110012, India). Journal of Crystal Growth, 112(2-3), 386-401 (English) **1991**. CODEN: JCRGAE. ISSN: 0022-0248.

AB **Cubic BN** single crystals were synthesized employing the BN-Mg system under high pressure and high temp. conditions. During the exploration of the thermodynamically stable **cubic BN** growth region, apart from the **cubic BN phase** the other cryst. **phases** formed during the chem. reaction are MgO, Mg3(BO3)2, **Mg3N2**, MgB6, or MgB12. Along with these **catalytic phases** the wurtzitic BN was also detected and reported for the first time. The role of various **phases** formed during the reaction was examd. and a possible explanation for the formation of wurtzitic BN is suggested. The morphol. of **cubic BN** crystals and their yield were studied as a function of temp. and pressure. The effect of O impurity present in the starting **hexagonal boron nitride** on the conversion to **cubic BN** is also discussed.

IT **10043-11-5**, Boron nitride (BN), properties
(crystal growth of **cubic**, under high pressure and high temp. using magnesium as **catalyst**)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IT **12057-71-5P**, Magnesium nitride (**Mg3N2**)
(formation of, in boron nitride-magnesium system)

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 68

ST **boron nitride cubic** crystal growth; transition **boron nitride hexagonal cubic**; morphol **boron nitride cubic** crystal

IT **Catalysts** and **Catalysis**
(magnesium, in **cubic boron nitride** crystal growth)

IT Crystal form
(of **boron nitride cubic** form, grown

under different pressure and temp. conditions)
IT Crystal growth
(of **boron nitride cubic** form, under high pressure and high temp. using magnesium as **catalyst**)
IT 7782-44-7, Oxygen, properties
(**boron nitride hexagonal-cubic** conversion in presence of impurity)
IT 7439-95-4, Magnesium, uses and miscellaneous
(**catalyst**, in crystal growth of **cubic boron nitride**)
IT **10043-11-5**, Boron nitride (BN), properties
(crystal growth of **cubic**, under high pressure and high temp. using magnesium as **catalyst**)
IT 1309-48-4P, Magnesium oxide, preparation 12008-22-9P, Magnesium boride (MgB6) **12057-71-5P**, Magnesium nitride (**Mg3N2**) 12230-32-9P, Magnesium boride (MgB12) 13767-68-5P, Magnesium borate (Mg3(BO3)2)
(formation of, in boron nitride-magnesium system)

L67 ANSWER 15 OF 30 HCA COPYRIGHT 2009 ACS on STN
114:67656 Original Reference No. 114:11493a,11496a On the choice of **hexagonal boron nitride** for high-pressure **phase transformation** using the **catalyst** solvent process. Bindal, M. M.; Singh, B. P.; Singhal, S. K.; Nayar, R. K.; Chopra, R.; Dhar, A. (Natl. Phys. Lab., New Delhi, 110 012, Ire.). Journal of Materials Science, 26(1), 196-202 (English) **1991**. CODEN: JMTSAS. ISSN: 0022-2461.
AB The degree of 3-dimensional ordering, particle-size distribution, and purity of 2 types of **hexagonal BN** were studied with a view to establish any possible correlation between these characteristics with the conversion of **hexagonal** form to **cubic phase** at high pressure and high temp. using Mg as the **catalyst** solvent. The cryst. **phases** formed at high pressure and high temp. were studied and the dependence of degree of graphitization of BN and purity on the **cubic BN** conversion discussed.
IT **7439-95-4**, Magnesium, uses and miscellaneous
(**catalyst** solvent, **boron nitride hexagonal-cubic phase transformation** in presence of)
RN 7439-95-4 HCA
CN Magnesium (CA INDEX NAME)

Mg

IT **10043-11-5, Boron nitride**, properties
(**hexagonal-cubic phase transformation** of, by **catalyst** solvent process)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-2 (Ceramics)
ST **boron nitride hexagonal cubic** transformation; **catalyst** solvent boron nitride transformation
IT **7439-95-4**, Magnesium, uses and miscellaneous
(**catalyst** solvent, **boron nitride hexagonal-cubic phase transformation** in presence of)
IT **10043-11-5, Boron nitride**, properties
(**hexagonal-cubic phase transformation** of, by **catalyst** solvent process)

L67 ANSWER 16 OF 30 HCA COPYRIGHT 2009 ACS on STN
112:144332 Original Reference No. 112:24285a,24288a Pecularities of the **cubic boron nitride** formation in the system boron nitride-magnesium nitride (**Mg3N2**) [Erratum to document cited in CA111(20):179496b]. Hohlfeld, C. (Inst. High Pressure Res., Acad. Sci. GDR, Potsdam, 1561, Ger. Dem. Rep.). Journal of Materials Science Letters, 9(1), 111 (English) **1990**. CODEN: JMSLD5. ISSN: 0261-8028.
AB Errors in the text and Table I have been cor. The errors were not reflected in the abstr. or the index entries.
IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**catalyst**, in **hexagonal**-to-**cubic boron nitride phase transition** (Erratum))
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **10043-11-5P**, Boron nitride (BN), preparation
(formation of **cubic**, mechanism of (Erratum))
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-2 (Ceramics)
ST Erratum **cubic boron nitride** formation

model
IT Ceramic materials and wares
(powd., **boron nitride**, formation of **cubic**, mechanism of (Erratum))
IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**catalyst**, in **hexagonal**-to-**cubic** **boron nitride phase transition** (Erratum))
IT **10043-11-5P**, Boron nitride (BN), preparation
(formation of **cubic**, mechanism of (Erratum))

L67 ANSWER 17 OF 30 HCA COPYRIGHT 2009 ACS on STN
111:179496 Original Reference No. 111:29786h,29787a Pecularities of the **cubic boron nitride** formation in the system boron nitride-magnesium nitride (**Mg3N2**). Hohlfeld, C. (Inst. High Pressure Res., Ger. Acad. Sci., Potsdam, 1561, Ger. Dem. Rep.). Journal of Materials Science Letters, 8(9), 1082-4 (English) **1989**. CODEN: JMSLD5. ISSN: 0261-8028.
AB The formation mechanism of **cubic** (**c**) **BN** from **hexagonal** (**h**) **BN**, particularly in the low-temp. region, was studied at varying temp. and 6.5 GPa by changing the stoichiometry of the starting **Mg3N2** + **h-BN** powder mixt. in a belt-type pressure cell. After quenching, the products were examd. by x-ray diffraction and DTA. A distectic equil. model describing the rapid and massive **c-BN** formation is given.
IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**catalyst**, in **hexagonal**-to-**cubic** **boron nitride phase transition**)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **10043-11-5P**, Boron nitride, preparation
(formation of **cubic**, mechanism of)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-2 (Ceramics)
ST **cubic boron nitride** formation model
IT Ceramic materials and wares
(powd., **boron nitride**, formation of **cubic**, mechanism of)
IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**catalyst**, in **hexagonal**-to-**cubic**

boron nitride phase transition)
IT **10043-11-5P**, Boron nitride, preparation (formation of **cubic**, mechanism of)

L67 ANSWER 18 OF 30 HCA COPYRIGHT 2009 ACS on STN
111:15598 Original Reference No. 111:2661a,2664a Theory of **catalytic** high-pressure **phase transition** in boron nitride. Lorenz, Bernd; Lorenz, Helmar (Inst. High Pressure Res., Ger. Acad. Sci., Potsdam, DDR-1561, Ger. Dem. Rep.). Semiconductor Science and Technology, 4(4), 288-9 (English) **1989**. CODEN: SSTEET. ISSN: 0268-1242.
AB The kinetics of the high-pressure **phase transition** in BN from the **hexagonal** to the **cubic** **phase** was investigated theor. On the basis of a nucleation and growth model various phys. quantities such as the net transformation rates at a fixed time were calcd. as functions of pressure and temp.
IT **12057-71-5**, Magnesium nitride (**Mg3N2**) (**catalysts**, theory of high-pressure **phase transition** in boron nitride using)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **10043-11-5**, Boron nitride, properties (**phase transition** in, theory of **catalytic** high-pressure)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 75-7 (Crystallography and Liquid Crystals)
Section cross-reference(s): 67
ST boron nitride **phase transition catalytic** theory
IT **Catalysts** and **Catalysis** (magnesium nitride, theory of high-pressure **phase transition** in boron nitride using)
IT **12057-71-5**, Magnesium nitride (**Mg3N2**) (**catalysts**, theory of high-pressure **phase transition** in boron nitride using)
IT **10043-11-5**, Boron nitride, properties (**phase transition** in, theory of **catalytic** high-pressure)

L67 ANSWER 19 OF 30 HCA COPYRIGHT 2009 ACS on STN

110:62445 Original Reference No. 110:10251a,10254a Synthesis of **cubic boron nitride** in the boron-nitrogen-magnesium ternary system. Vasilescu, A.; Benea, I.; Copaciu, V.; Calu, G.; Mitea, D. (Inst. Phys. Met. Technol., Bucharest, Rom.). Sverkhtverdye Materialy (3), 23-5 (Russian) **1988**. CODEN: SVMAD2. ISSN: 0203-3119.

AB The transformation of **hexagonal BN** (BNh) into **cubic BN** (BNc) in the presence of **Mg3N2**, Mg, and MgB2 **catalysts** was studied. Tests were made with 2 BNh specimens contg. 0.7 and 4% B2O3. The basic and impurity **phases** in BNc crystals were detd. by x-ray diffraction and the concn. of Mg by emission spectroscopy. The possible reactions in BN-**catalyst**-B2O3 systems were analyzed on the basis of exptl. data. A correlation was established between the impurity content in BNc and B2O3 content in the BNh.

IT **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**catalyst**, for **cubic boron nitride** formation from **hexagonal phase**)

RN 12057-71-5 HCA

CN Magnesium nitride (Mg3N2) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, formation of, from **hexagonal boron nitride**)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-7 (Ceramics)

ST **cubic boron nitride** magnesium **catalyst**

IT **Catalysts** and **Catalysis**
(for **cubic boron nitride** formation from **hexagonal phase**)

IT 7439-95-4, Magnesium, uses and miscellaneous 12007-25-9, Magnesium diboride **12057-71-5**, Magnesium nitride (**Mg3N2**)
(**catalyst**, for **cubic boron nitride** formation from **hexagonal phase**)

IT **10043-11-5P**, **Boron nitride**, preparation
(**cubic**, formation of, from **hexagonal boron nitride**)

L67 ANSWER 20 OF 30 HCA COPYRIGHT 2009 ACS on STN

102:189824 Original Reference No. 102:29725a,29728a Synthesis of

cubic boron nitride. (Showa Denko K. K., Japan). Jpn. Kokai Tokkyo Koho JP 59217608 A **19841207** Showa, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1983-90602 19830525.

AB **Hexagonal BN** is placed in a heat-resistant vessel with C, heat-treated in N2 at 2000-2400°, then mixed with a **cubic-BN** forming **catalyst**, and treated under a pressure and a temp. which the **cubic-BN** is stable. The products are esp. useful for grinding stones and cutting tools. Thus, 8 **hexagonal-BN** blocks were placed in a C-crucible contg. 2 C blocks and heated for 3 h at 2200° in a high-frequency induction furnace to give light yellow-colored **hexagonal BN** particles. The particles were buried in powd. **Mg3N2**, heated for 5 h at 1150° (to give **hexagonal-BN** contg. .apprx.2 wt.% Mg3N2B4), and press-sintered for 30 min at .apprx.50 kbar and 1450° to give a **cubic-BN** block having Knoop hardness 5650 kg/mm2 and **cubic-BN** purity 99.9%.

IT **10043-11-5P**, preparation
(synthesis of **cubic**, from **hexagonal phase**, for grinding stones and cutting tools)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

IC ICM C01B021-064
ICS C04B035-58

CC 57-7 (Ceramics)

ST **cubic boron nitride** synthesis; **hexagonal boron nitride** heat treatment; cutting tool **cubic boron nitride**

IT Size reduction apparatus
(grinding stones, **boron nitride** synthesis for, **cubic-phase**)

IT Tools
(cutting, **boron nitride** synthesis for, **cubic-phase**)

IT 96281-68-4P
(formation of, in **hexagonal boron nitride**, in synthesis of **cubic phase**)

IT **10043-11-5P**, preparation
(synthesis of **cubic**, from **hexagonal phase**, for grinding stones and cutting tools)

L67 ANSWER 21 OF 30 HCA COPYRIGHT 2009 ACS on STN

102:49948 Original Reference No. 102:7807a,7810a Production of **cubic** crystalline **boron nitride**. Kreubig, D.; Noll, G. (Kloeckner-Humboldt-Deutz A.-G., Oberursel, Fed. Rep. Ger.). Report, BMFT-FB-T-84-025; Order No. N84-25836, 47 pp. Avail. NTIS From: Gov. Rep. Announce. Index (U. S.) 1984, 84(20), 126 (German) **1984**.

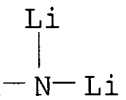
AB An appropriate high pressure high temp. app. for the prodn. of **cubic BN** from **hexagonal BN** was developed and built, and a synthesis process was devised and tested. **Mg3N2**, **Li3N**, Al, and Si were investigated as initiators (**catalysts**) of the process. A first survey of the effect of the materials used and the synthesis parameters on the formation and growth of the **cubic BN** crystals was gained. Present work is concd. on the prodn. of **cubic BN** grains with properties as required by manufacturers of grinding and cutting tools.

IT **12057-71-5 26134-62-3**
(**catalyst**, in **cubic boron nitride** manuf.)

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5P**, preparation
(manuf. of **cubic**, for grinding and cutting)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

CC 57-7 (Ceramics)
ST **cubic boron nitride** manuf
IT 7429-90-5, uses and miscellaneous 7440-21-3, uses and miscellaneous **12057-71-5 26134-62-3**
(**catalyst**, in **cubic boron nitride** manuf.)
IT **10043-11-5P**, preparation
(manuf. of **cubic**, for grinding and cutting)

L67 ANSWER 22 OF 30 HCA COPYRIGHT 2009 ACS on STN

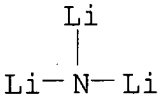
101:215479 Original Reference No. 101:32611a,32614a Hard abrasive particles. (Sumitomo Electric Industries, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 59121167 A **19840713** Showa, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1982-234742 19821227.

AB Polycryst. hard abrasive particles are composed of **cubic BN** primary particles of av. particle size ≥1μ and 1-5 vol.% **cubic BN** synthesizing **catalyst**. The particles are manufd. by hot pressing a mixt. of 90-99.9 vol.% **hexagonal BN** and 0.1-10 vol.% nitrides or boronitrides of a group IA or group IIA metal (as synthesizing **catalyst**) at 40-65 kbar and 1350-1800° (**cubic BN** is thermodynamically stable at this pressure and temp. range) to convert **hexagonal BN** into **cubic BN** and simultaneously converting it to a polycryst. body contg. solvents and then pulverizing to the desired particle size. The particles have high hardness and are useful for abrasion and grinding. Thus, **hexagonal BN** powder and **Mg3N2** powder were treated in N atm. to give Mg3B2N4 powder. **Hexagonal BN** powder 97 vol.% and Mg3B2N4 powder 3 vol.% were mixed, molded, and treated at 50 kbar and 1450° to give a body contg. 0.3 wt.% Mg. An x-ray diffractometer showed only the **cubic BN** diffraction peak. Then, the body was pulverized, plated with Ni, and processed to a grinding stone using 60/80 mesh particles and a resin binder. The grinding stone had a large grinding ratio.

IT **26134-62-3**
(**catalysts**, for **boron nitride hexagonal**-to-**cubic** transformation for abrasives)

RN 26134-62-3 HCA

CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5P**, preparation
(prepn. of **cubic**, with **catalysts** for transformation of **hexagonal** form, for abrasives)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

IC C04B035-58

CC 57-7 (Ceramics)

ST grinding **cubic boron nitride**; abrasive boron nitride; group IIA nitride grinder; polycryst **cubic boron nitride** grinder

IT Abrasives
(boron nitride prepn. for, with **catalyst** for **hexagonal**-to-**cubic** transformation)

IT Abrasives
(grindstones, boron nitride prepn. for, with **catalyst** for **hexagonal**-to-**cubic** transformation)

IT 12013-82-0 12408-97-8 **26134-62-3** 53322-25-1 65453-44-3 65453-51-2 71330-55-7
(**catalysts**, for **boron nitride** **hexagonal**-to-**cubic** transformation for abrasives)

IT **10043-11-5P**, preparation
(prepn. of **cubic**, with **catalysts** for transformation of **hexagonal** form, for abrasives)

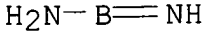
L67 ANSWER 23 OF 30 HCA COPYRIGHT 2009 ACS on STN
101:176353 Original Reference No. 101:26613a,26616a Sinters for high-hardness tools. (Sumitomo Electric Industries, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 59088375 A **19840522** Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1982-197086 19821109.

AB **Cubic BN** sinters for high-hardness tools are comprised of 10-85 vol.% Al2O3 which is homogeneously dispersed in a continuous **phase** of **cubic BN** (the balance) that is converted from **hexagonal BN** by Ca boride-nitride and/or Mg boride-nitride **catalyst** added as 0.01-5 wt.% of a Ca-B-N and/or Mg-B-N compd. The prepn. of the sinter is also claimed. The **cubic BN** sinter has excellent chem. stability, thermal resistance, and high hardness. Thus, a mixt. of **hexagonal BN** 50 and Al2O3 50 vol.% with Mg boride-nitride (3 wt.% of the **hexagonal BN**) was pressed and heated to give a sinter which was prepd. as a cutting tool that had excellent cutting properties.

IT **71330-55-7**
(**catalyst**, for **boron nitride** **hexagonal** to **cubic phase** **transformation** for ceramic cutting tools)

RN 71330-55-7 HCA

CN Boranamine, 1-imino-, magnesium salt (2:3) (9CI) (CA INDEX NAME)



IT **10043-11-5**, uses and miscellaneous
(ceramic cutting tools of **cubic**, with alumina dispersed **phase**)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

IC C04B035-58; C04B035-10; C22C029-00
CC 57-7 (Ceramics)
IT **Catalysts** and **Catalysis**
(alk. earth boride nitride, for **boron nitride hexagonal** to **cubic** transformation for ceramic cutting tools)
IT Ceramic materials and wares
(**boron nitride, cubic**, with alumina dispersed **phase**, for cutting tools)
IT Tools
(cutting, ceramic, **cubic boron nitride**, with alumina dispersed **phase**)
IT 65453-51-2 **71330-55-7**
(**catalyst**, for **boron nitride hexagonal** to **cubic phase transformation** for ceramic cutting tools)
IT **10043-11-5**, uses and miscellaneous
(ceramic cutting tools of **cubic**, with alumina dispersed **phase**)

L67 ANSWER 24 OF 30 HCA COPYRIGHT 2009 ACS on STN
101:96505 Original Reference No. 101:14707a,14710a **Cubic boron nitride**. (Showa Denko K. K., Japan). Jpn. Kokai Tokkyo Koho JP 59073410 A **19840425** Showa, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1982-180006 19821015.
AB A 2:(1-1.4) mol ratio mixt. of BN and nitrides of Be, Mg, Ca, Sr, and/or Ba is fired in an inert gas at 800-1300° and used as a **catalyst** for synthesis of **cubic BN** from **hexagonal BN**. Thus, a mixt. of **Mg3N2** 0.8, Ca3N2 0.4, and BN 2 mol was fired in N gas at 1000° for 40 min, crushed to <150 mesh, mixed with **hexagonal**

BN at a 1:10 wt. ratio, compacted, and hot-pressed at 1500° and 58 kbar to give a **cubic BN** cylinder having crushing strength 4.11 + 108 kg/m2 (sic), compared to 3.61 when the **catalyst** mix was not prefired. The yield for both cases was 35 and 29%, resp.

IT **12057-71-5**
(**catalysts**, for transformation of **hexagonal boron nitride** to **cubic phase** cylinders)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **10043-11-5**, uses and miscellaneous
(transformation of **hexagonal**, to **cubic phase** cylinders, nitride **catalysts** for)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IC C01B021-064; B01J027-24
CC 57-2 (Ceramics)
ST nitride **catalyst** boron nitride transformation
IT Ceramic materials and wares
(**boron nitride, cubic phase**, cylinders of, from **hexagonal boron nitride**)
IT **Catalysts** and **Catalysis**
(nitride, for **hexagonal boron nitride transformation** to **cubic phase** cylinders)
IT 12013-82-0 **12057-71-5**
(**catalysts**, for transformation of **hexagonal boron nitride** to **cubic phase** cylinders)
IT **10043-11-5**, uses and miscellaneous
(transformation of **hexagonal**, to **cubic phase** cylinders, nitride **catalysts** for)

L67 ANSWER 25 OF 30 HCA COPYRIGHT 2009 ACS on STN
99:42532 Original Reference No. 99:6621a,6624a Synthesis of **cubic boron nitride**. (Komatsu, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 58060604 A **19830411** Showa, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1981-154775 19811001.
AB **Hexagonal BN** contg. <3500 ppm O2 (preferably <1000 ppm O2) is used for the synthesis of **cubic**

BN at >40,000 atm and >1200° in the presence of, e.g. Si-Al, Si-AlN, Li, Mg, Ca, **Li3N**, **Mg3N2**, or Ca3N2 as **catalyst**. It can be used for making cutting tools for steels. Thus, **hexagonal BN** contg. 820 ppm O2 (100 parts) was mixed with powd. Si (20 parts) and AlN (5 parts), formed, and heated at 56,000 atm and 1650° for 20 min. The yield of **cubic BN** was 72%.

IT **10043-11-5P**, preparation
(synthesis of **cubic**, from **hexagonal phase**)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

IC C01B021-064; B01J027-24

CC 57-7 (Ceramics)
Section cross-reference(s): 55

ST **cubic boron nitride** synthesis

IT Tools
(cutting, **cubic boron nitride** synthesis for)

IT 7440-21-3, uses and miscellaneous 24304-00-5
(**catalyst**, in **cubic boron nitride** synthesis)

IT **10043-11-5P**, preparation
(synthesis of **cubic**, from **hexagonal phase**)

L67 ANSWER 26 OF 30 HCA COPYRIGHT 2009 ACS on STN

85:9601 Original Reference No. 85:1517a,1520a **Phase** transformation of wurtzite-type boron nitride at high temperatures and pressures. Hiraoka, Hideo; Fukunaga, Osamu; Iwata, Minoru (Cent. Res. Lab., Denki Kagaku Kogyo Co., Ltd., Tokyo, Japan). Yogyo Kyokaishi, 84(4), 163-70 (Japanese) **1976**. CODEN: YGKSA4. ISSN: 0009-0255.

AB Wurtzite-type BN powders produced by a shock compression method were treated at 1 atm to 80 kbar and at 650-2220 for 30 min. **Phases** were identified by x-ray diffraction and scanning electron microscopy. Direct transformation from wurtzite-type to **cubic BN** was obsd. at a lower pressure region than that of direct transformation from **hexagonal** to **cubic BN**. The P-T region of **cubic BN** formation was detd. This formation region of **cubic BN** disagreed with the stable region of **cubic BN** owing to the sluggish rate of transformation from wurtzite-type to **cubic BN**.

Mg3N2 catalyst accelerates the transformation. Tentative boundary among wurtzite-type, **hexagonal**, and **cubic BN** was discussed.

IT **10043-11-5**
(**phase** transformation of wurtzite-type, at high temp. and pressure)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 57-7 (Ceramics)
Section cross-reference(s): 68
ST boron nitride **phase** transformation
IT **10043-11-5**
(**phase** transformation of wurtzite-type, at high temp. and pressure)

L67 ANSWER 27 OF 30 HCA COPYRIGHT 2009 ACS on STN
83:125343 Original Reference No. 83:19617a,19620a Synthesis of **cubic boron nitride** by the **catalytic** process. Fukunaga, Osamu; Sato, Tadao; Iwata, Minoru; Hiraoka, Hideo (Natl. Inst. Res. Inorg. Mater., Sakura, Japan). Proc. Int. Conf. High Pressure, 4th, Meeting Date 1974, 454-9. Editor(s): Osugi, Jiro. Phys.-Chem. Soc. Jpn.: Kyoto, Japan. (English) **1975**. CODEN: 30RHAF.

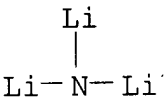
AB Growth pressure-temp. (P-T) regions of **cubic BN** in the systems, BN-Mg, BN-**Li3N** and BN-**Mg3N2**, were redetd. up to 80 kb. **Hexagonal BN** of different grades were used as starting materials. The habit, size and yield of **cubic BN** crystals were greatly affected by the amt. of oxide in the starting materials. The effect of oxide impurity on the P-T region of **cubic BN**, however, was not obvious. The P-T region of **cubic BN** in the present systems was basically consistent with the previous data. Superpressure was needed to form **cubic BN** below 1550° in these systems. The superpressure was discussed in relation to the breakage of sp2-type B-N linkage. The superpressure increased with decreasing temp. following an approx. linear relation.

IT **10043-11-5**
(**cubic**, growth of, **catalytic**)

RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

IT **12057-71-5 26134-62-3**
(system, **boron nitride-, cubic boron nitride** formation in)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



CC 78-5 (Inorganic Chemicals and Reactions)
ST **boron nitride cubic catalytic**
IT **10043-11-5**
(**cubic**, growth of, **catalytic**)
IT 7439-95-4, properties
(system, **boron nitride-, cubic boron nitride** formation in)
IT **12057-71-5 26134-62-3**
(system, **boron nitride-, cubic boron nitride** formation in)

L67 ANSWER 28 OF 30 HCA COPYRIGHT 2009 ACS on STN
69:39313 Original Reference No. 69:7371a,7374a Mechanism of formation of **cubic boron nitride**. Filonenko, N. E.; Ivanov, V. I.; Sokhor, M. I.; Fel'dgun, L. I. Trudy - Vsesoyuznyi Nauchno-Issledovatel'skii Institut Abrazivov i Shlifovaniya, No. 2, 5-11 From: Ref. Zh., Khim. 1967, Abstr. No. 15M23 (Russian) **1966**. CODEN: TVNABG. ISSN: 0372-2945.
AB The phys.-chem. conditions of formation of **cubic B nitride** were studied. Some compns. in the ternary system Mg-B-N were examd. The products obtained were studied by microscopic, chem., and x-ray methods. A combined **phase** anal. with chem. treatment and sepn. in heavy liqs. was also carried out. At 38-40 kilobars and 1100-450°K. the reaction between **Mg3N2** and elemental B will yield MgB2, MgB6, and **hexagonal BN**. At higher pressure (65 kilobars) and temp. (1860-2000°K.) the reaction products contain **cubic BN** as small (≤20 μ), dark tetrahedral crystals in addn. to **hexagonal BN**. **Cubic BN**, obtained from a mixt. of **hexagonal BN** with metals at high pressures and temp., is formed according to the general principles of crystn. in ternary and more complex systems. When the mixt. consists of

hexagonal BN and Mg the latter does not act as a **catalyst** but reacts with BN at 1000° to form Mg nitride and diboride according to 4Mg + 2BN = MgB2 + **Mg3N2** . To obtain any considerable amt. of **cubic BN** as crystals of several tenths of a μ in size, the compn. of the reaction mixt. should be such that at the appropriate pressure and temp. the **cubic BN** becomes the 1st crystn. **phase**; i.e., a melt is obtained whose compn. is within the stability field of BN in the selected ternary or more complex system.

IT **10043-11-5**
(crystal growth of **cubic**)

RN 10043-11-5 HCA

CN Boron nitride (BN) (CA INDEX NAME)

B≡N

CC 70 (Crystallization and Crystal Structure)

ST **cubic B nitride; nitride**
B cubic; boron nitride
cubic; formation **cubic B nitride**

IT Crystal growth
(of **boron nitride** (**BN**) of **cubic** modification)

IT **10043-11-5**
(crystal growth of **cubic**)

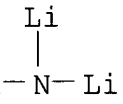
L67 ANSWER 29 OF 30 HCA COPYRIGHT 2009 ACS on STN

54:134225 Original Reference No. 54:25675f-i Abrasive boron nitride. Wentorf, Robert H., Jr. (General Electric Co.). US 2947617 **19600802** (Unavailable). APPLICATION: US .

AB **Cubic BN** is prepd. having a hardness substantially equal to diamonds, while exhibiting thermal stability superior to presently available abrasive materials. Ordinary BN is subjected to an elevated temp. and pressure in the presence of at least 1 **catalyst**, e.g. an alkali, or alk. earth metal, Sn, Pb, Sb, or their nitrides. Thus, 3 parts by vol. of **hexagonal BN** and 1 part of lumps of Mg were subjected to 69,000-95,000 atm. at 1300-2100° for 3 min. The av. yield of **cubic BN** was about 1/5 carat in the form of generally cylindrical jagged crystals with an av. diam. of 0.2-0.4 mm. Spectrog. examn. of the material formed at 86,000 atm. showed the presence of B and Mg. In scratch tests, this material scratched polished B carbide as well as the **cubic** and octahedral face of a diamond. The x-ray diffraction anal. indicated a **cubic** structure analogous to sphalerite with a unit-cell edge length of 3.615 A. ± 0.001A. at 25°. The material

had a d. of 3.45. In other examples, Na, K, Li, Ba, Sr, Ca, Pb, Sb, Sn, Mg nitride, Li nitride, Ca nitride, mixts. of Ca and Li nitrides, Ca nitride and Na, Mg nitride and Mg, Mg nitride and Sn were used as **catalysts**. In other examples, the reaction mixt. was B and Ca with alternate layers of CaCN2 and powd. B, and a mixt. of Ni and Mg nitrides. Abrasive articles are prepd. by bonding **cubic BN** to a base member by any suitable means.

IT **12057-71-5P**, Magnesium nitride
(as **catalyst** in BN manuf.)
RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **26134-62-3P**, Lithium nitride
(as **catalysts** in BN manuf.)
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



IT **10043-11-5P**, Boron nitride, **BN**
(manuf. of **cubic**, at high pressure and temp. with **catalyst**, for abrasives)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

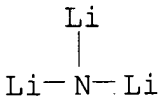
CC 19 (Glass, Clay Products, Refractories, and Enameled Metals)
IT Alkali metal nitrides
Alkaline earth nitrides
Nitrides
(as **catalysts** in BN manuf.)
IT Abrasives
(**boron nitride** (**cubic**) for)
IT Alkali metals
Alkaline earth metals
(**catalysts**, in BN manuf.)
IT **Catalysts**
(for **boron nitride** (**cubic**) manuf.)
IT **12057-71-5P**, Magnesium nitride 52036-89-2P, Lead nitride 55574-97-5P, Tin nitride
(as **catalyst** in BN manuf.)
IT 12013-82-0P, Calcium nitride **26134-62-3P**, Lithium nitride

143499-07-4P, Antimony nitride
(as **catalysts** in BN manuf.)
IT 7440-24-6P, Strontium
(**catalysts** in BN manuf.)
IT 7439-93-2P, Lithium 7439-95-4P, Magnesium 7440-31-5P, Tin
7440-36-0P, Antimony 7440-39-3P, Barium 7440-70-2P, Calcium
12136-83-3P, Sodium nitride
(**catalysts**, in BN manuf.)
IT 7439-92-1P, Lead
(**catalysts**, in **BN** transformation from
hexagonal to **cubic** structure)
IT **10043-11-5P**, Boron nitride, **BN**
(manuf. of **cubic**, at high pressure and temp. with
catalyst, for abrasives)

L67 ANSWER 30 OF 30 HCA COPYRIGHT 2009 ACS on STN
51:96860 Original Reference No. 51:17447f-g Infrared spectra of inorganic solids. II. Oxides, nitrides, carbides, and borides. Brame, Edward G., Jr.; Margrave, John L.; Meloche, Villiers W. (Univ. of Wisconsin, Madison). Journal of Inorganic and Nuclear Chemistry, 5, 48-52 (Unavailable) **1957**. CODEN: JINCAO. ISSN: 0022-1902.
AB cf. C.A. 51, 9318d. Infrared spectra from 2 to 16 μ were detd. for **hexagonal Li3N**, **cubic** Cu3N, **hexagonal BN** and AlN, **cubic Mg3N2** and Zn3N2, **hexagonal** B2O3, rhombohedral Cr2O3, Ga2O3, Al2O3, and B4C, **hexagonal** SiC, tetragonal Mo2B, and undesignated CrN, ZrB2, and TiB2 **phases**. Of the four latter, only Mo2B showed any bands. Mass effect on major band position and familial spectral spectral character were discussed.
IT **10043-11-5**, Boron nitride, BN **12057-71-5**, Magnesium nitride, **Mg3N2 26134-62-3**, Lithium nitride
(spectrum of)
RN 10043-11-5 HCA
CN Boron nitride (BN) (CA INDEX NAME)

B≡N

RN 12057-71-5 HCA
CN Magnesium nitride (Mg3N2) (CA INDEX NAME)
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 26134-62-3 HCA
CN Lithium nitride (Li3N) (CA INDEX NAME)



CC 3 (Electronic Phenomena and Spectra)
IT 409-21-2, Silicon carbide 1303-86-2, Boron oxide, B2O3
1308-38-9, Chromium oxide, Cr2O3 1308-80-1, Copper nitride (Cu3N)
1313-49-1, Zinc nitride, Zn3N2 1344-28-1, Aluminum oxide
10043-11-5, Boron nitride, BN 12024-21-4, Gallium oxide,
Ga2O3 12045-63-5, Titanium boride, TiB2 12045-64-6, Zirconium
boride, ZrB2 **12057-71-5**, Magnesium nitride, **Mg3N2**
12069-32-8, Boron carbide, B4C 24094-93-7, Chromium nitride, CrN
24304-00-5, Aluminum nitride, AlN **26134-62-3**, Lithium
nitride
(spectrum of)